Accessing Green Space in Cape Town

A case study of public perceptions of green space and barriers of access in eight nature reserves and conservation areas within Cape Town

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By

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Dissertation presented in partial fulfilment of the requirements for the degree of Master of Philosophy

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March 2015

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Plagiarism Declaration

I know the meaning of plagiarism and declare that all of the work in the dissertation, save for that which is properly acknowledged, is my own.

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Acknowledgements

I would like to thank first and foremost, my advisor, Pippin Anderson for her patience, support, and feedback throughout this entire process. It was truly invaluable, and I would not be here without her assistance. I'd also like to thank the members of the GIS laboratory at the University of Cape Town for putting in long hours to assist me with the GIS mapping. Furthermore, I'd like to extend my appreciation to all the key informants who willing sat and spoke with me for hours, as well as all other park employees for their patience and cooperation in answering all my questions. I also thank the participants of this study, who sacrificed their time to be surveyed and contributed to the data in this study; I learned a great deal from each and every one of you. I must also thank my study colleagues in the MPhil Environment, Society, and Sustainability class, for their support during both exciting and difficult times. Finally, a heartfelt thanks to my family for their enduring support, encouragement, and love.

Abstract

In an increasingly urbanised world, addressing the need for access to urban green space has become a pertinent topic of interest. In Cape Town, South Africa, a city of immense biodiversity and unique spatial development, the issue of accessing urban green spaces is particularly important. Environmental and ecological advocates call for conservation of green space, to preserve the rare biodiversity of the region, while pressures for continued development to accommodate the City's growing population override land conservation policy aspirations. The legacy of post-apartheid development is still strongly entrenched in Cape Town, resulting in an inequitable and inefficient city form. Access to quality green space remains problematic in Cape Town. This research seeks to discover how accessible urban green spaces are in Cape Town, and, if barriers exist, whether they are physical, economic, or socially driven. The author has undertaken a case study method approach to conduct this research, focusing on eight nature reserves or conservation areas managed by the City of Cape Town in the southern and eastern suburbs of the City. Key informant interviews (n= 6) were conducted, as well as qualitative and quantitative surveys of park users and the general public. Park users (n= 672) were surveyed on site, at one of the eight green spaces, while the public (n= 317) were surveyed at the nearest commercial shopping area adjacent to the green space. Outcome measures included demographic information, suburb of residence, mode of transport, reasons for choosing mode of transport, frequency of green space visits, and reasons for visiting. Results show the majority of park users accessed the green space by personal vehicle, and very few park users took public transport (n= 3). The majority of users resided in suburbs within two kilometres of the green space. Park users varied in age, yet young adults aged 16-19 and elderly over the age of 80 accounted for only 2.8% and 1.8% of those surveyed, respectively. The ethnic breakdown of those surveyed was not indicative of Cape Town's ethnic breakdown, according to the 2011 Census, with white South Africans and coloured South Africans accounting for 50% and 39%, respectively. Over a quarter of the public surveyed identified 'lack of information' or 'unaware of what park offers' as the reason for not visiting the green space. Safety and security was a common concern among both park users and the public; many expressed concern about visiting the green space alone, or traveling alone due to issues of security in the adjacent neighbourhoods. From the data gathered in this research, the author concludes that barriers exist in the access of quality green spaces within Cape Town, and include, but are not limited to, issues of proximity, public transport, safety and security, spatial development of the City, varied green space interests, and information barriers. These issues vastly alter how users engage in these eight different green spaces. Further research may be conducted in a more expansive study on Cape Town's green spaces, including small local green spaces in neighbourhoods throughout the City, which may yield interesting results on the access and barriers to access of urban green spaces.

Table of Contents

List of Figures

List of Tables

Abbreviations

CBD	Central Business District
CFR	Cape Floristic Region
CoCT	City of Cape Town
EPWP	Expanded Public Works Programme
IRT	Integrated Rapid Transit
MSDF	Metropolitan Spatial Development Framework
NBA	National Biodiversity Assessment 2011
NBF	National Biodiversity Framework 2008
NBSAP	National Biodiversity Strategy and Action Plan 2005
NEMA	National Environmental Management Act 107 of 1998
NEMBA	Nat'l Environmental Management: Biodiversity Act 10 of 2004
NMT	Non-Motorized Transport
NPAES	National Protected Area Expansion Strategy 2008
RDP	Reconstruction and Development Programme
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
WWTW	Waste Water Treatment Works

1 Introduction

Access to urban green spaces and the value of such green space has recently emerged as a topic of interest and concern, as countries and cities become increasingly urbanised. Current literature recognises that access to green spaces, particularly in an urban environment, provides an array of benefits for users, which may include improvements to mental, physical, emotional, and social health. Recent studies maintain the importance of green spaces for the health of urban dwellers through exercise, outdoor social interaction, stress reduction, and environmental education (Nielsen & Hansen, 2007; Kaplan et al., 1998; Scopelliti & Giuliani, 2004; CoCT, 2008). Growing research in this area notes that access to urban green space can also benefit a city through crime reduction, social cohesion, urban regeneration, economic gain, and environmental awareness (Fuller and Irvine, 2010; Liverpool City Council, 2010; Depart of Transport, Local Govt, and Regions, 2006). Current literature in this area acknowledges the importance of urban green spaces for urban dwellers, and provides a contextual background for the research proposed in this study. The City's Spatial Development Framework of 2012 calls for "the availability and accessibility of basic services, social facilities and public open spaces to everyone" (CoCT, 2012b, p. 26). Yet challenges remain in Cape Town in regards to equitable access of quality green spaces, relating to the legacy of apartheid spatial planning (Goodness & Anderson, 2013). This research will address the issue of access to urban green spaces, which has been shown to be a 'problem' in the context of the City of Cape Town requiring further investigation (CoCT, 2012b; Goodness & Anderson, 2013; CoCT, 2008).

Access theory refers to "the ability to derive benefits from things," where "things" may include material objects, people, institutions, and symbols (Ribot & Peluso, 2003, p. 153). To understand how people are able to access resources, such as green spaces, it is crucial to identify circumstances by which some people are able to benefit from the particular resource while others are not, which can be done through access analysis (ibid.). Access analysis involves several components: identifying the resource benefit (green space), identifying the mechanisms by which different actors gain access to the benefit (technology, capital, knowledge, and social identities) and conducting an analysis of the power relations triggering the mechanisms of access involved where benefits are derived (government policies) (ibid.). Recognition of varying types of 'power' in access relations implies that access to green space may differ a great deal, for numerous reasons. When access to green space is varied and unequal, environmental justice concerns become involved.

Environmental justice refers to the equal and fair distribution of benefits and costs associated with the environment (Agyeman & Evans, 2004). The Commonwealth of Massachusetts, for example, states that "environmental justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment" (2002, p. 2). However, studies reveal that vast inequities exist with respect to access and quality of green spaces (Garcia & White, 2007; Sliuzas & Kuffer, 2008; Heynen et al., 2006; Wolch et al., 2005; Ashwell, 2010). While some research has shown that urban areas of high poverty and lower socioeconomic means are closer in distance to green spaces than those of their wealthier counterparts (Maroko et al., 2009; Franzini et al., 2010), issues of "social access" such as safety, traffic, and walkability may directly affect green space utilisation (Weiss et al., 2011). In addition, the quality of facilities and resources of green spaces in higher poverty neighbourhoods may deter people from green space use (Franzini et al., 2010). This research seeks to determine who is using green spaces and how accessible green spaces are in Cape Town, in neighbourhoods of varying socio-economic means.

Cape Town is a city which faces inequities in green space access and environmental justice. It is also a city characterised by immense diversity in its culture, people, geography, and flora and fauna. Cape Town falls within the Cape Floristic Region, which has a high proportion of unique and endangered species (CoCT, 2008). Critical biodiversity areas, wetlands, waterways and agricultural areas are being lost or degraded by uncontrolled urban encroachment, and need to be actively protected (CoCT, 2012b). The City of Cape Town Sustainability Report (2006a, p. 14) states that "in order to achieve long-term sustainability, promote social well-being and recreation, and conserve Cape Town's unique biodiversity, it is essential that the City continues to conserve, improve, and maintain its green space, and improve public access to these areas." The provision of good quality green spaces within a city is a vital part of creating a healthy living environment, where residents can find recreational opportunities and aesthetic enjoyment.

Unfortunately, easy access to good quality public green space remains problematic in Cape Town (CoCT, 2006a). For many residents of poor suburbs, public green space continues to be inaccessible due to the distance that they are required to travel because public transport linkages to the City's nature reserves, beaches, and Table Mountain National Park are poor (CoCT, 2006a; CoCT, 2013). Cost of transport and admission into certain green spaces may also be a hindrance. According to the 2012 Spatial Development Framework, public transportation currently remains insufficient in the City, characterised by its declining quality in terms of service infrastructure, reliability and frequency, creating challenges for residents in accessing resources, such as green spaces (CoCT, 2012b). The promotion of easy access to quality green space has been a goal of the City of Cape Town, but action remains limited (CoCT, 2006a; CoCT, 2012b).

The spatial development of Cape Town affects the distribution and access of quality green spaces in the City. Cape Town remains characterised by social exclusion; the inequitable and inefficient city form of post-apartheid development is still entrenched in Cape Town, and therefore challenges exist in restructuring the shape of the City. Current development trends point to middle income residential developments located on the periphery of the city, resulting in a more fragmented pattern of low density, car-oriented development (CoCT, 2012b; Turok & Watson, 2001). In the metro southeast, where one third of the population of Cape Town resides, developments have largely focused on the upgrade and de-densification of informal settlements (CoCT, 2012b). The area remains the least economically developed in the City, lacking access to basic amenities and services, and only accounting for a fraction of the total formal economy (ibid.). Recent studies reveal that, in areas of lower socio-economic status, there is poor access to green open space in the City (CoCT, 2013). Access to open green space remains a key challenge in the City, according to the 2012 State of Environment Report (ibid.).

Access to green space can be affected by a number of different barriers, be it physical, economic, or social. The study seeks to explore who is accessing green spaces within Cape Town and how accessible certain public green spaces are to Capetonians. This study, while not attempting a full access analysis as proposed by Ribot and Peluso (2003), seeks to explore the current state of use of, and access to, green space in the City of Cape Town, in the context of global understandings of the relevance of green space socially and the City of Cape Town's explicit articulated desire to conserve nature, provide recreational space, and improve general access through revisiting city wide transport. The study focuses on eight different nature reserves and conservations spaces, in predominantly residential neighbourhoods in the southern and eastern suburbs, to determine who uses these spaces and why, or why not. Challenges to green space access are often physical (distance, transport), economic (entrance fees, cost of transport), social (peer pressures), and mental (knowledge gaps, safety concerns). Improving the spatial structure of the City to ensure that all citizens have access to high quality resources and facilities is central to the Cape Town Spatial Development Framework (CoCT, 2012b). The City must manage Cape Town's development in order to protect its natural assets, and promote densification in appropriate locations in order to encourage more sustainable use of resources and improve economies of scale (ibid.). At the same time, the spatial development of Cape Town needs to be adaptable, in regards to constantly having "to balance competing agendas for the provision of basic needs, social services and utilities against the stimulation of economic development and employment, management of city growth, and the protection of environmental resources and systems" (CoCT, 2012b, p. 29).

2 Research Aim and Objectives

Research Aim and Question:

The study focuses on eight nature reserves and conservation spaces located in areas of varying economic and social equity, in the southern and eastern suburbs of Cape Town. The aim of this research is to discover who is using these urban green spaces, how they are accessing the sites, and why. This project seeks to answer the following questions:

How accessible are Cape Town's urban green spaces? Do barriers exist, and if so, are they physical, economic, or socially driven?

Objectives:

- Identify who accesses urban green spaces in the City of Cape Town by establishing a demographic profile
- Evaluate who is, and who is not, using green space.
- Determine how these users are accessing the selected urban green spaces
- Establish transportation routes in relation to the specific green spaces in study
- Establish why users are visiting green spaces and evaluate people's reasons and rationale for visiting green space

3 Theoretical and Local Context

3.1 Theoretical Framework

This study does not fit neatly within one theoretical framework, but rather draws on a number of diverse and relevant literatures. I have attempted to make reference to the appropriate literature on the issues regarding access of green space, particularly in the Cape Town context. The Theoretical and Local Context Chapter begins by discussing green space in its varying definitions and then continues on to the history of green space. The chapter then draws on the various literatures regarding access and use of urban green spaces including benefits of green space, teens in green spaces, social barriers to green spaces, proximity, access theory, environmental injustice, urban design, and public transportation. In addition, the sections on proximity, access, environmental injustice, and urban design provide a framework to analyse the data captured in the study (section 3.6-3.10). The chapter concludes with local context on the City of Cape Town, as a site where access to urban green space is a concern, providing a background of Cape Town's unique biodiversity and spatial development. This Chapter seeks to illustrate, through the literature, why green spaces are relevant, why access to green space is beneficial, and what barriers may exist relevant to this research.

3.2 Open Green Space

Open space is an ill-defined concept that has differing meanings to people. It can include agricultural or forest land preserves, conservation easements, wildlife habitats, buffers along waterways, local and regional parks, cemeteries, and golf courses and playing fields (Galant, 2011; Choumert & Salanie, 2008). Green spaces vary in size, age, design, planting, facilities, maintenance, and patterns of use. They are made up of various elements including trees, grass, pathways, benches, ponds, fountains, statues, gardens, playgrounds, and sporting facilities (Byrne & Wolch, 2009). Green open spaces are considered places of social interaction and education, cultural identity, tourist destinations, and important for property development (ibid.). The City Parks Department of Cape Town defines public open spaces primarily in terms of its functions, such as district parks, community parks, cemeteries, and beaches (Galant, 2011). There is no clear definition of the term and there is a tendency to use terms such as natural areas, biodiversity sensitive spaces, sport fields, public squares and coastal areas interchangeably with public open spaces (ibid.). While the definition of public open spaces does address the functionality of such spaces, the City of Cape Town fails to understand how people interact in such spaces and what value is placed upon them, as well as access issues. Current debates in the literature address these concerns, and the definition of green space is a constantly shifting concept. Therefore, no single, clearly defined

definition is available, yet there is a general shift in literature to create a more broadly stated definition. In the case of San Francisco, the City derives a more inclusive definition for what green space means. The City of San Francisco, in its Draft Open Space Framework (City of San Francisco, 2008, p. 4), defines open spaces as "publicly-owned spaces and publicly-accessible-privately-owned spaces meeting the needs and desires of its citizens for a variety of recreational/social activities and the experience of nature, while conserving human and natural resources." The long term vision of the Framework focuses on linkages of parks, playgrounds, plazas, landscaped areas, beaches, and all varieties of recreational facilities and natural areas with corridors such as parkways, trails, walkways, and alleyways, to provide for human recreation and wildlife movement (ibid.). In this study, the term 'green space' is used. The areas under examination are all considered conservation worthy areas of value to (or contributing to) the broader global conservation agenda, and are all open to the public and framed as sites of public access and recreation.

3.3 History of Green Space

Historically, green spaces originated from the aristocratic garden landscapes in ancient Greece, India, China, and the Middle East, as well as European medieval deer parks (Byrne & Wolch, 2009). More recently, the ornately landscaped estates of the European elite served as inspiration for public green spaces (ibid.). Public green spaces were created in England, by English aristocrats seeking "pastoral aesthetic," and then subsequently throughout Europe, for fresh air, recreation, and social interaction, in the period following the Industrial Revolution (Byrne & Wolch, 2009; Conway, 2000). In the United States, urban green spaces were a response to the development of large cities, prompted by concerns over access to nature and clean air (Pincetl & Gearin, 2005). In the 1930s, in the United States, focus turned to enhancing recreation areas, and public green spaces became functionally segregated into playgrounds, museums, entertainment areas, and public gardens (ibid.). Democratic concerns also replaced public health issues, with landscape architects arguing that public green spaces increase contact between social classes and foster inclusiveness (Rosenzweig & Blackmar, 1992). However, the reality of public green spaces was not one of integration and cohesion (Byrne & Wolch, 2009). The urban poor and ethnic minorities initially protested the construction of many park projects, both in England and the United States, eventually leading to 'race riots' in various American green spaces during the 1920s (ibid.). Socioeconomic and racial differences continued to define much of the park system, particularly within the United States. Public green spaces, such as Central Park in New York City, were designed far from public transportation and beyond walking distance for working-class tenements (Rosenzweig & Blackmar, 1992). Park managers imposed strict behavioural rules and dress codes, which inhibited usage by working class and immigrant users (ibid.). Segregation of green spaces was common within many Southern states through the 1950s, leading to the development of separate facilities for Blacks, which were generally smaller, received less funding, with fewer facilities, and in inferior locations (Byrne & Wolch, 2009). Studies of green spaces reveal

that, historically, many parks were racially charged spaces (ibid.). While green space dynamics have changed with a more globalised world, there are implications that green space usage is still differentiated ethnically and socioeconomically (ibid.).

In Cape Town during the 20th century, urban growth accelerated exponentially, resulting in a significant loss of natural habitat and green spaces (CoCT, 2008). Due to the unique biodiversity within Cape Town, much of the impetus to plan for open green spaces was to protect the region's endangered vegetation. Historically the conservation of natural areas in Cape Town has been rather disjointed, as eight government organizations in the area were involved in management: seven local authorities, the Western Cape Nature Conservation board (now CapeNature), and government agencies such as the South African Defence Force, Public Works and South African Forestry Corporation (CoCT, 2008). This collection of varied authorities resulted in a fragmented approach to public green spaces and city-wide planning during apartheid. Primary focus was given to the Peninsula Mountain Chain rather than the lowlands areas, though a few reserves were named (prior to 1982) such as Bracken, Rondevlei, and Zandvlei nature reserves (ibid.). After several floral and vegetation studies were conducted in the late 1980s and early 1990s, the City of Cape Town used the recommendations of the studies to guide decision-making in regards to future development proposals (ibid.). Little action was taken however, and many of the larger remnants of biodiversity were lost to development while others slowly degraded due to lack of management (ibid.). After the Table Mountain Park was established in 1998, local and provincial governments had more freedom and time to focus conservation efforts on the Cape Flats (ibid.). Continued conservation management of the lowland natural areas is implemented through the Biodiversity Network, in conjunction with the four current main custodians: the City of Cape Town, CapeNature, SANBI and SANParks (CoCT, 2008). CapeNature is the provincial nature conservation authority which bears some responsibility for biodiversity management in the City, including invasive plant management and animal control, as well as being the manager of the provincial ordinance for protected species (ibid.). SANBI, the South African National Biodiversity Institute, reports on the state of biodiversity in South Africa, carries out research, provides knowledge, and advises planning and management models in partnership with stakeholders (SANBI, 2013). SANParks (South African National Parks), as a national governing body, is mainly responsible for management of Table Mountain National Park (CoCT, 2008).

Between 1985 and 2005, the City of Cape Town had increased by 40% in area, with little planning and management of this growth in regard to provision and capacity of infrastructure and appropriate spatial planning (CoCT, 2006). The City of Cape Town held an "Evaluation of Developable Land within Urban Edge study" which identified that the City has land available for development within the urban edge of the city until 2021 (Spatial Planning and Urban Design, 2010). City growth has increased at an average of 650 hectares per year between 1996 and 2007 (ibid.). This growth statistic is based on all urban land-uses such as housing, industry,

schools, clinics, infrastructure and informal settlements; however, the statistic excludes parks, open sports fields, public open space and roads (ibid.). According to the study, projected land required for development in the City is 9100 hectares over the next ten years, which only accounts for hard-scape spaces such as infrastructure and housing (ibid.). The exclusion of parks and open spaces in land requirement figures is an indication of the challenge regarding adequate provision of land for the development of quality green spaces (Galant, 2011). The physical footprint of the City of Cape Town is 2461 km^2, of which the City Parks Department manages 69.97 km^2, just less than 3% of the city land area (City Parks Department, 2010). Within that area, the Department manages 6084 public green spaces including parks, cemeteries, greenbelts, public gardens, outdoor recreational spaces, and passageways (City Parks Department, 2010; Galant, 2011). There is a strong drive to create a comprehensive urban green space network in South Africa (CoCT, 2006), yet there are no clear standards for green space provision, nor the policy framework to implement them (Fuller & Irvine, 2010). Political drives also affect how land is distributed (Galant, 2011), thus making it more difficult for conservation of urban green space. Prioritisation is a concern; land available for development is a scarcity and when faced with addressing the basic needs of people, conservation of public green spaces is given low priority (ibid.). There is also concern amongst South African officials as to how an environmental conservation agenda may be perceived by the public (Goodness & Anderson, 2013). Issues of social injustice, due to reinforcement of racist apartheid systems, and disrespect, particularly to the poor, by blocking development for housing and infrastructure, may affect the willingness of local officials to focus on conservation (Wilhelm-Rechman & Cowling, 2010). It is likely that environmental issues and biodiversity will remain in the background of political concerns into the future, as a growing population and climate related changes place pressure on the government to focus on the most basic needs of the populace (Goodness & Anderson, 2013).

3.4 Benefits and Challenges of Green Space

3.4.1 Benefits of Green Space

Many urban dwellers seek out green spaces in order to interact with nature through recreation and exercise (Li et al., 2005), to enjoy fresh air, and to relax in peace and quiet (Irvine et al., 2010). Open green spaces offer opportunities for outdoor social interaction for people of all ages and relaxing from stressful everyday life (Scopelliti & Giuliani, 2004). They can improve the quality of life and health of community members through various ecosystem services, as well as provide educational spaces and nature-based tourism opportunities (CoCT, 2008). Use of urban green space also provides psychological health benefits by relieving mental fatigue (Kaplan, 2001), reducing stress levels (Nielsen & Hansen, 2007), and improving people's sense of well-being

(Kaplan et al., 1998). People appreciate public green areas that are open and accessible to the public, well equipped, well maintained, and offer opportunity for both social and physical activities (Bonnes et al., 2010). International studies over the last ten years underline the importance of nature for people's well-being, particularly in the urban environment where there is an urgent need for urban greening (Van Herzele & Wiedemann, 2003). In a survey conducted in Guangzhou, China, 59% of respondents reported visiting urban green spaces often or very often (Jim & Chen, 2006) while a UK survey recorded 92% of participants visiting urban green spaces (GreenSpace, 2007).

There are a variety of benefits in access and use of green space, including physical and psychological health, urban regeneration, economic gain, social cohesion, crime reduction, sense of community and environmental awareness (Fuller & Irvine, 2010; Liverpool City Council, 2010; Department of Transport, Local Government, & the Regions, 2006). Local green spaces can promote a sense of community in neighbourhoods by connecting people and they can reduce crime and antisocial activities within the local community (CoCT, 2008; Kim & Kaplan, 2004; Walker, 2004). The presence of green spaces in a given neighbourhood is a significant positive predictor of residential satisfaction for its inhabitants (Bonnes et al., 2010). Public facilities and public spaces are venues which allow people to congregate, discuss, perform, protest, and interact outside of the private realm (Mammon et al., 2008). These are important spaces for recreation and relaxation, particularly in areas where positive urban space is less available (ibid.).

3.4.2 Teens in Green Spaces

Green spaces ideally should service the entire community population, but access to green spaces is particularly crucial for teenagers and youth. As young people are usually more dependent on the local environment than adults, their local environment plays an important role in their environmental development and social identity (Depeau, 2001; Bell et al., 2003). Adolescence is a crucial time in which young people enter a key stage of identity formation; encouraging youth to engage in nature and within green spaces supports adolescent identity development (Ashwell, 2010). Teenagers who visit green spaces are likely to be more physically active, which may contribute to a reduction of cardiovascular disease risk factors such as body mass index and blood pressure (Panico et al., 1987; Sallis et al., 1988; Strazzullo et al., 1988). Physically active youth are more likely to become physically active adults (Telama et al., 1997; Yang et al., 2006). In addition, physical activity has psychological benefits of higher self-esteem and lower anxiety and stress in teens (Calfas and Taylor, 1994). Providing appropriate facilities and programmes for teenagers in green spaces can also provide a healthy and safe environment for social and physical activities.

Adolescents are attracted to low-cost, well-maintained facilities that offer preferred activities and are within close proximity to home (Ries et al., 2009). They are drawn to facilities where they find other active

adolescents, and they avoid those where young people are engaged in drug and gang activity (ibid.). In addition, they value places with scenic views, peaceful environments, and availability of activities (Makinen & Tyrvaninen, 2008). Ries et al. (2011) performed a study among teens which suggests that improvements in facility quality may increase adolescent use of facilities for physical activity. In addition, accessibility and safety have been theorised to inhibit youth's physical activity, but research is lacking in this field (Romero, 2005). According to Romero's study (2005), youth were more likely to engage in physical activity at local facilities when they had a higher perception of a safe adult presence as well as increased number of staff members (Moody et al., 2004). Two qualitative studies identified several factors impacting facility use, including a lack of adolescent-oriented activities, poor maintenance, cost, distance, the presence of other physically active peers, lack of awareness, and safety (Ries et al., 2009; Ashley et al., 1997). In a survey of youth throughout Cape Town, 90% of teenagers responded positively when asked how they personally felt about nature and 71% stated that nature was important to teenagers in general (Ashwell, 2010). A majority of those surveyed (80%) also stated that the nature-based programmes they were involved with helped to change their attitudes and practices, in regards to environmental awareness, environmentally responsible behaviour, and interest in conservation-related careers (ibid.). According to Ashwell (2010), most young people care deeply about nature, but lack opportunities to express their concern as meaningful action. For many of these young people, school excursions are some of the few opportunities they have to experience natural areas (ibid.).

3.4.3 Social Barriers to Green Spaces

Green spaces must be attractive and safe, and have a sufficient diversity of amenities to meet the needs of people with multiple different interests (Jacobs, 1961). Certain green spaces, however, can generate negative perceptions from the population. Environments that lack relevant resources or pose barriers, like high crime rates, may act to reduce the probability that residents will visit such environments. Some people view green spaces as overcrowded (Arnberger & Haider, 2005), dangerous places (Jorgensen et al. 2007; Galant, 2011), and places of illicit activity such as voyeurism, sexual gratification, drug use, and thievery (Kornblum, 1983). One analysis in the United States found that low-income, African American and Latino neighbourhoods had better walking access to green spaces than higher income areas, yet this advantage was offset by higher crime which made people less likely to walk (Cutts et al., 2009). Neighbourhood crime can be a significant barrier to people dwelling in low-income urban areas (Fulton County: Surgeon General's report, 1996). Perceptions of safety were lowest in communities with higher population density and a higher percentage of households in poverty (Cohen et al., 2010). In Cape Town, some communities on the Cape Flats view natural remnants as unsafe places characterised by criminal activities (CoCT, 2008, Ashwell, 2010). This is largely due to the fact that the sites are covered in thickets of alien Acacias and receive no management (CoCT, 2008). The dense alien vegetation creates visual barriers into the green spaces, and thus become areas in which criminal activity is

believed to take place. The challenge is to effectively manage these remnants and maintain biodiversity as well as change the public perception to a positive one (ibid.). In order to improve spatial access to green spaces and recreational facilities, an expansion of the concept of green space access must include safe walkable streets around green spaces and greater safety from crime.

Young people can also be wary of visiting public open spaces due to safety concerns. Sometimes children can be seen as a problem by others and become marginalised (Davis & Jones, 1997). The Donnington Recreation Ground Project in the UK, recorded by the local Government Association, involved young people creating a meeting point and designing their own shelter and seating within the ground; this reduced vandalism, graffiti, and a fear of crime, as well as enhancing community relations and the young people's sense of ownership of the grounds (Ferguson, 2004). More initiatives must be made to empower young people to play a greater role in the decision making processes in community green spaces. In Bristol City, community members embarked on the Knowle Slopes Project which sought to reclaim open space for the community and help to reduce problems such as motorcycle use of the area, dumping, and illegal grazing (Ferguson, 2004). Outcomes of the Knowle Slopes Project were successful, allowing for the improvement and reclamation of open space, community involvement, an improved sense of security in the area, and subsequently, a greater use of the space (ibid.).

Open green spaces provide a variety of benefits for users, including mental, physical, and emotional health. Access to green spaces should be available to all community members, particularly adolescents. Providing safe and appropriate green spaces for youth encourages facility use, which may also lead to a healthier adult lifestyle. Despite the obvious health benefits to green space access, visitation patterns and usage are influenced by the public's perception of the green space. This perception may be affected by safety concerns, high crime rates, vegetation, and quality of facilities, leading to a negative view of the space and lack of use. While there is little literature investigating those who are not using green spaces, a few studies have data from current and potential users by randomly selecting residents that live in the vicinity of a green space (Payne et al., 2002; Cole & Bussey, 2000). A study of that type may reveal possible barriers or constraints as to why certain green spaces are not used, perhaps leading to efforts to ameliorate these issues to ensure public access to such important services (Schipperijn, 2010).

3.5 Proximity

According to Coles and Bussey (2010), the distance to a green space is the most important factor affecting its usage; the closer a green space is to each individual's home, the more it is used. Research has shown that proximity and access to green spaces and outdoor recreational opportunities are positively correlated with active behaviours (Cohen et al., 2006; Cohen et al., 2007; Diez-Roux et al., 2007), while greater distance to physical activity facilities has been associated with less exercise (Sallis et al., 1990). The role of proximity in

determining green space visitation seems to vary; more than 90% of respondents to a survey in Guangzhou, China indicated that proximity was important or very important in their decision to visit an urban green space (Jim and Chen, 2006) and studies in both the UK and US have found that people generally desire a green space within three to five minutes' walk of their home or workplace (Godbey et al., 1992).

According to Van Herzele and Wiedemann (2003), people should be able to access a neighbourhood green space of at least one hectare at a distance of 400 metres from their home, or approximately five minutes walking distance. A public green space of 10 hectares should be within 800 metres; a public green space of 30 hectares should be within 1600 metres; a public green space of 60 hectares should be within 3200 metres; and a public green space greater than 200 hectares (small towns) or greater than 300 hectares (big cities) should be within 5000 metres (ibid.). Van Herzele and Wiedemann (2003) developed a method to monitor the provision of accessible and attractive urban green spaces and determined that the larger the green space, the longer people are willing to travel to it, and the larger the catchment area. People desire local green spaces near their homes for frequent use, but will travel farther distances to a larger destination location. Distance and size are believed to affect, in tandem, the use, and access of, urban green spaces (Coles and Bussey, 2000; Van Herzele and Wiedemann, 2003).

3.6 Access

Access to green space is crucial in order to take advantage of the benefits which public green space provides. According to Ribot and Peluso's theory of access (2003, p. 153), access is "the ability to derive benefits from things," which may include material objects, people, institutions, and symbols. Looking into access involves focusing on "the issues of who does (and who does not) get to use what, in what ways, and when (that is, in what circumstances)" (Neale 1998, p. 48). Access analysis can assist in explaining why some people or institutions benefit from resources, whether or not they have rights to them (Ribot & Peluso, 2003).

There are various mechanisms, processes, and social relations that may affect people's ability to benefit from resources (Ribot & Peluso, 2003). In order to understand how people are able to access resources, it is crucial to identify circumstances by which some people are able to benefit from particular resources while others are not (ibid.). This can be better examined through access analysis, where there is both access control (the ability to mediate someone's access) and access maintenance, which involves using resources or powers to keep a particular sort of resource access open (ibid.). Resources are often contested among those who control and those who maintain access (Ribot & Peluso, 2003). Access analysis involves identifying the benefit of interest, identifying the mechanisms by which different actors gain, control, and maintain the benefit flow and its distribution, and an analysis of the power relations underlying the mechanisms of access involved in instances where benefits are derived (ibid.).

Identifying the particular benefit coming from a specific resource is the first step in access analysis (Ribot & Peluso, 2003). For this study, the benefits of accessing urban green space are numerous but can be simplified to improved physical and psychological health of community members. The next step is to analyse the multiple mechanisms by which individuals, groups, or institutions gain, control, or maintain access within particular political and cultural circumstances (Ribot & Peluso, 2003). Gaining access to urban green space can be determined by a number of factors including physical barriers (proximity, public transport, costs, physical mobility issues), and psychological barriers (interest or knowledge of green spaces, perceptions of safety). Controlling and maintaining access to urban green space is determined by the City of Cape Town and the Parks Department. Access can be controlled and properly maintained by the City by addressing certain issues such as creating appropriate locations for green spaces, ensuring quality infrastructure (roads) to access the green space, improving the quality of public transport around the green space, enforcing a security presence in and around the space, managing appropriate and attractive facilities, and promoting knowledge dissemination of green spaces.

According to Blaikie (1985), capital and social identity also influence who has resource access priority. Ribot and Peluso (2003) extend this to include technology, capital, markets, knowledge, authority, social identities, and social relations. These categories reinforce the various issues listed above which affect how access to green space is gained, controlled, and maintained, by individuals and government institutions. In this study, the categories of technology, capital, knowledge, and social identities are most applicable. Access to technology may refer to the quality of roads (or lack of roads), which affect how people or vehicles are able to access green spaces. Access to capital may be thought of as access to wealth, in the form of finances or equipment (Ribot & Peluso, 2003). Being able to afford a vehicle or the costs of public transport improves access to green spaces; owning a home in a safe community near quality green space also ensures accessibility. Access to knowledge, which includes beliefs and ideologies, shape all forms of access (Ribot & Peluso, 2003). Knowledge awareness of green spaces, programmes, and facilities has major implications on user access. Some constraints to access are socially dictated, such as access through social identity (ibid.). This may refer to membership in a community or group, including groupings by age, gender, ethnicity, religion, and common education (ibid.). Accessing green spaces may or may not be a ‘social norm’ within a community, or a peer group, such as teenagers, leading certain people to feel unwelcome in a space. Access to resource benefits involves this “bundle of powers” which includes technology, capital, knowledge, and social identities (ibid.). Analysis of access should be focused on the policies and institutions that enable and disable different actors to gain, maintain, or control resource access and the benefits of such access (ibid.).

3.7 Environmental Injustice

While environmental justice is a contested and evolving term, it is ultimately about equal and fair distribution of benefits and costs (Agyeman & Evans, 2004). An early foundation of environmental justice focused solely on forms of pollution (the environmental 'bad'), but has now evolved to include, more sustainably, a larger array of concerns including access to environmental benefits and resources of various forms (Walker, 2009). The perception of environmental justice and actions taken to support it have expanded and evolved over time, affected by political conditions, ideological realities, legal systems, histories of racism, spatialisation, and natural conditions (Debbane & Keil, 2004).

Access to green space and green space provision varies around the world. In Israel, the city scale is 20 m^2 of public green space per capita (Omer & Or, 2005), while in Johannesburg, South Africa, the guideline is 20-40 m^2 of public green space per capita (Johannesburg Open Space System, 2002). Open space provision equals about 6 m^2 per urban inhabitant of Kuala Lumpur (Dali, 2004) as compared to 1 m^2 per inhabitant of Bangkok (Fraser, 2002). While these figures give an overview of available green space for city inhabitants, distribution between city dwellers can vary considerably. Socioeconomic and racial disparities reveal varying degrees of environmental injustice. In Los Angeles, levels of green space provision among the white population exceed that of the black population by a factor of 20 (Garcia & White, 2007). Recent efforts by the California government are focused on raising the quantity of access to natural spaces as well as ensuring equity across the population (ibid.). A negative relationship between green space availability and human socioeconomic deprivation has also been noted in New Delhi (Sliuzas & Kuffer, 2008) and certain cities in North America (Heynen et al., 2006; Wolch et al., 2005). Lower incomes may relegate people to neighbourhoods where green spaces are scarce or not well managed (Floyd, 1999; Lee et al., 2001). In a study conducted by Wen et al. (2013), the results showed that poverty levels were negatively associated with distances to parks and percentages of green spaces in urban/suburban areas. In Cape Town, a survey of youth to establish green space usage determined that schools in wealthier areas were usually located closer to natural areas than schools in poorer areas, where families were also unlikely to be able to afford transport or entrance fees (Ashwell, 2010). In some cases, access to green spaces may be higher in areas of lower socioeconomic means, but the quality of the green space is substantially less than that of wealthier areas. Weiss et al. (2011) noted the difference between spatial access to green spaces and "social access," a term recently coined to refer to sociodemographic features such as safety, traffic, and walkability that may directly affect green space utilisation. Physical availability of public green space does not guarantee green space utilisation. Interventions to reduce disparities in physical activity and green space access must also address the quality of resources and facilities available in these spaces.

In South Africa, historically there is a long-held perception that local communities threaten conservation areas and do not value biodiversity, thereby undermining local people's knowledge and the contribution they make to their environment (Ramutsindela, 2003). After the end of apartheid, the government sought to address the racial injustices and promote national reconciliation by launching a land reform agenda focused on land redistribution, tenure reform, and restitution (ibid.). As a result, many tribal groups filed for land reclamation, yet there were concerns of land claims involving national parks and conservation areas despite policy support (ibid.). The National Parks Board stated in 1995 (p. 31) that "the South African communities are the custodians of national parks, and the successful conservation of natural resources will only be achieved if local communities have access to national parks, and are fully involved in the decision-making process, and should derive tangible direct benefits." Actual practice has only begun to evolve as authorities began to recognise the importance of the integration of local communities into an environmental conservation agenda (Ramutsindela, 2003; Shackleton et al., 2000). This realisation is connected with the belief that poverty alleviation is necessary to reverse environmental decline (Reardon & Vosti, 1995) and that redistributive land reforms have the potential for significant economic development (Shackleton et al., 2003. There are various examples of tribal groups reclaiming land which is now a part of the national park system or on conservation land with no intention of physical occupation of the land (Ramutsindela, 2002; Ramutsindela, 2003). Rather, land reclamation is motivated by cultural reasons, income benefits from park management and ecotourism, and conservation interests (Ramutsindela, 2003), which strongly implies that local communities are invested in the preservation of the land. Environmental injustice concerns have led to a focus on human-environmental relationships, which was clearly addressed in the 1992 United Nations Convention on the Conservation of Biological Diversity, "each government shall subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biological diversity" (p. 6). Perspectives held by South African officials are slowly catching up to the policies and decrees that have been in place, but not actioned, for years.

The 1996 South African Constitution sets forth basic environmental rights in the Bill of Rights, stating that all South Africans have "the right to an environment that is not harmful to their health and wellbeing; and to have the environment protected, for the benefit of present and future generations" (Constitution of the Republic of South Africa, p. 1251-2). However, policy does not always translate into practice. In Cape Town, Nisa Mammon (2005, p. 6) identifies that "the city has become more polarised since the advent of democracy through forcing mass developments onto cheap land on the periphery, and reinforcing lack of access to major opportunities and agglomerations in the city, instead of bringing people closer to these opportunities." The 2001 Socio-Economic status index by suburb for Cape Town reveals a city of immense inequity (Ewing & Mammon, 2008). The majority of the households living in absolute poverty are clustered in the Metro South-East which

experiences the highest (growing) density (ibid.). Informal housing is often dense, but deprived of adequate water supply, sanitation, solid waste management, education and healthcare (ibid.). Public facilities, open green spaces, and institutions are critical when addressing urban planning and restructuring needs which aim to improve social and economic integration (ibid.). There needs to be a balance between growth and access to opportunities, and provision of access and convenience for a full range of people, especially those who move on foot (ibid.). Ensuring equitable access to green space is an important policy consideration for promoting equality among Capetonians as well as encouraging healthy living.

3.8 Urban Design

Good urban design is core to creating viable public green spaces and can influence the economic and social success of a geographic area. Studies reviewed by Active Living Research (2010) reveal a growing tendency for people to prefer high density, walkable neighbourhoods with public open spaces or pedestrian walkways. Landscape architecture and landscaping of walkways, parks, roadside areas and public green spaces contribute to creating a sense of place and space (ibid.). The Spatial Development Framework of the City of Cape Town references the importance of public open spaces, parks, and landscaping in creating a desirable urban environment (CitySpace, 2010). Town planning in Cape Town has traditionally favoured low-density housing developments away from the city centre, a practice which still continues. A call for denser urban centres is needed, with a plan for improved public transport and the retention of open green spaces, both natural and agricultural (CoCT, 2008). Housing demands, with a backlog of 260,000 families (now estimated at 400,000) on housing waiting lists, challenge the creation and preservation of green spaces (ibid.). In 2007, the CSIR conducted a study in the City of Cape Town regarding standards and guidelines for the provision and development of social facilities and public open spaces. The proposed guideline for open space provision was a minimum of 2% and a maximum of 10% of the total land to be developed be set aside for public open space based on 0.5ha/1000 people standard and the allocation of 50 dwelling units per hectare (CSIR, 2007). Given such provisions, it is important for city planners and managers to realise that each user of urban green spaces has different preferences and needs (Bonnes et al., 2010). Public consultation is necessary when developing public open spaces to gauge people's value of the space and their perceptions of its function (Wall, 1992).

Urban development in Cape Town is a result of apartheid planning and design practice. It is illustrated by a widely dispersed population and is spatially disproportionate in terms of social development planning and economic possibilities (Ewing & Mammon, 2006). The urban poor are pushed away from the central business district and employment areas; the wealthy occupy key valuable sites adjacent to the mountain and sea; and suburbia 'in-between' has low-density, single dwelling residential patterns (ibid.). There is a critical lack of integration of the different income groups. The compact city concept discussed by Kenworthy (2006, p. 68-69)

notes that one key dimension of sustainable city development is the return to "a compact, mixed use urban form that uses land efficiently and protects the natural environment, biodiversity and food producing areas." Giles-Corti and Donovan (2002) also extol the need for mixed land use diversity as the best solution for accessibility and access to green spaces, infrastructure, and a healthy landscape. Urban planners might also consider designing greenways composed of corridors, which are linked to nodes, or patches, within the surrounding landscape matrix, thereby providing connectivity throughout the landscape (Viles & Rosier, 2001). The planning and design of the built environment, the distribution of density, the occupation of space and the subsequent impact on the quality of life of citizens should be at the forefront of South African policy (Mammon et al., 2008). Strong governance and political will combined with interaction and participation of citizens is crucial to the success of urban planning in Cape Town (ibid.).

3.9 Public Transportation

Since the mid-1990s, policies in Cape Town have acknowledged that physical development needs to be focused on making more integrated living environments and broadening goals to include the delivery of community facilities, public amenities, and sports and recreational opportunities (Mammon et al., 2008). In reality however, public transport, economic development opportunities and a quality public realm are generally not addressed (ibid.). Although public transport stops and public spaces are now included, they are typically delivered retrospectively and provide meaningless connections to the surrounding sprawling suburban networks (ibid.). Transport in Cape Town is still dominated by the private vehicle as opposed to promoting clean, efficient, affordable and safe use of public transport and non-motorised transport (CoCT, 2006). Currently, thought on traffic management deals with ways of addressing commuter demand (mainly private) by building more highways to eradicate congestion (Tran:SIT, 2007) with little consideration for a large majority of the population who are reliant on travelling long distances at a great expense to access economic opportunities, employment, health centres and educational institutions (Mammon et al., 2008). There is a need to make the city flexible and accessible to all citizens.

Transportation networks in Cape Town need to be integrated, properly managed and regulated (Mammon et al., 2008). Public transport and non-motorised transport (NMT) projects will require major upgrades and improvement in terms of equipment (vehicles, stations, terminals, exclusive bus ways, cycle facilities, and adequate pedestrian sidewalks), quality of service, education and awareness programmes, and safety and reliability to encourage people out of their cars and onto the bus (ibid.). The City needs to acknowledge the role of design in transportation planning by ensuring that solutions are appropriate and responsive, and focusing on linkages of various interfaces such as housing, work, education, health, and recreational spaces (ibid.). There needs to be a reassertion of the public realm including green spaces (for recreation, cultural gatherings, and

urban agriculture), and provision of movement corridors connecting such urban spaces, social institutions and facilities, utility services and emergency services (ibid.). When these are brought into association with each other, they create an 'accessibility network' (ibid.). For example, investment in NMT should be prioritised along urban corridors and main streets that lead to urban markets and public spaces of high interest for safe and comfortable transport (ibid.). Public transport, walking, and cycling must become key components of the city and large freeway and road infrastructure should be de-emphasised (Kenworthy, 2006). Land use and public transportation must be integrated to support public mobility (ibid.). A network of public transport on focused routes connecting a hierarchy of nodes, public spaces and infrastructure is needed (ibid.).

3.10 Local Context on Cape Town

The City of Cape Town is located in the Western Cape Province, on the most south-westerly point of South Africa, along the Atlantic Ocean. It is part of an area of unique biodiversity, which poses challenges for both the conservation of vegetation and the delineation of green spaces in the City. The City of Cape Town is in the Cape Floristic Region (CFR), one of only six floral kingdoms in the world, which has a high proportion of unique and endangered species (CoCT, 2008). The CFR is considered one of the 34 global "biodiversity hotspots," which is defined as an area with numerous plant species that has lost 70% of its habitat and is threatened with further destruction (Conservation International, 2013). Conservation of Cape Town's biodiversity is a concern. A majority of the vegetation types within the City are not well-managed, particularly in the Cape Flats, where large-scale changes have taken place due to commercial agriculture and urban development (CoCT, 2008).

Eleven of the twenty-one Critically Endangered national vegetation types occur within the City of Cape Town, of which three appear only within the City boundaries (CoCT, 2008). Nearly one sixth of the plant species in South Africa can be found in Cape Town, with 70% endemic to the CFR (ibid.). At least 190 plant species are locally endemic to Cape Town, but unfortunately, the City has already lost 49 plant species and 13 of these are now globally extinct or extinct in the wild (ibid.). In order to protect these endangered species, the City of Cape Town has connected its biodiversity conservation planning to national planning under the Biodiversity Act 10 of 2004 (NEM:BA), which falls under the National Environmental Management Act 107 of 1998 (NEMA) (ibid.). NEMA serves as the main statute that establishes frameworks and practices for environmental management, assessment, and governance (Goodness & Anderson, 2013). Within the Biodiversity Act, there are four main policies which guide conservation and ecosystem protection (ibid.). These include the National Biodiversity Strategy and Action Plan 2005 (NBSAP), the National Biodiversity Assessment 2011 (NBA), the National Protected Area Expansion Strategy 2008 (NPAES), and the National Biodiversity Framework 2008 (NBF) (ibid.). Guided by these legal frameworks, the City has identified a network of sites, called the Biodiversity

Network, required to conserve a representative sample of the unique biodiversity within the City (CoCT, 2008.). Despite having strong environmental legislation within South Africa, enforcement issues abound due to conflicting demands, fiscal constraints, and a lack of execution (Goodness & Anderson, 2013). In addition, implementation of policies can be difficult given the multiscalar nature of such legislation, creating potential conflicts between National, Provincial, and City leaders (ibid.). A look into the history of Cape Town's spatial development further explains difficulties facing the City in regards to conservation and access of green space and biodiversity.

Prior to the 1950s, the City of Cape Town had a reasonably efficient spatial form considering its unique physical setting (Turok, 2001). Transportation routes dictated the City's development, to the south and north-east of the Central Business District (CBD) (ibid.). Many people lived in mixed-race residential areas and the City enjoyed a relatively liberal reputation as a result (Wilkinson, 2000). During the post-war era, the city's spatial structure was transformed by apartheid planning, resulting in rigid residential segregation and forced removal of an estimated 150,000 people to the townships, or informal settlements, built on the Cape Flats (ibid.). The legacy of apartheid planning on Cape Town's spatial development has left it as a "starkly polarised city" (Turok, 2001, p. 2349). It created deep divisions in human, economic, and spatial development via population controls, forced removal, and separate, unequal governing institutions (ibid.). The dichotomy of wealth in the City is easily observed; affluent suburbs and prosperous economic centres contrast with overcrowded, impoverished informal settlements on the periphery (ibid.). The topography and natural environment of Cape Town has also affected the distribution of communities and neighbourhoods. Wealthier suburbs skirt the coastline and base of Table Mountain, while lower income houses and informal settlements are relegated to the flood-prone plains of the Cape Flats. These distorted settlement patterns were created through apartheid planning, emphasising social segregation and physical fragmentation (Turok, 2001). To further segregate communities, local municipalities were separate, racially based entities, where black townships were strictly regulated and consistently denied industrial, commercial, and retail development (ibid.). As a result, people were forced to shop in white areas, where white municipalities benefited from the economic activity and taxes (ibid.). With a smaller population to serve and a higher concentration of wealth, white municipalities were able to support their residents with well-developed infrastructure, good quality facilities, high standards of public services and employment opportunities (ibid.). In contrast, the predominantly black townships lacked essential services, infrastructure maintenance, and land availability, which led to overcrowding, dilapidated buildings, and environmental damage (ibid.). The Development and Planning Commission (1999, p. 30) described informal settlements as "inefficient, fragmented, inconvenient and massively wasteful in terms of both publicly- and private-controlled resources." The Cape Town City Council acknowledged that the lack of coherent planning often resulted in "haphazard *ad hoc* crisis management decisions in such vital areas as urbanisation, informal settlement and environmental policy" (1993, p. 2).

After the end of apartheid and the repeal of apartheid spatial segregation laws, the possibility of spatial transformation existed (Goodness & Anderson, 2013). Calls for a new perspective in urban planning with a focus on integration led to a group of representatives, community organisations, and consultants coming together to prepare new proposals in the early 1990s (Watson, 1998). Together, they developed the Metropolitan Spatial Development Framework (MSDF) which stressed promotion of mixed-use, higher-density development of residential, employment, retail and recreational land uses (CMC, 1996). While the MSDF was widely accepted by stakeholders and endorsed in other policy documents, it lacked high-level political support and was generally seen as a specialised policy lacking immediate relevance (Turok, 2001). Development changes have been taking place within Cape Town, with trends showing a decentralisation of business growth as companies move to outer-lying suburbs (ibid.). These expanding employment centres are less well served by public transport than the CBD, resulting in a more fragmented pattern of low density, car-oriented development (Turok & Watson, 2001). This growth momentum is particularly apparent in the northern suburbs, with an increase of residential and commercial development, while the concentration of low-income housing in the southeast sector remains (ibid.). According to Turok (2001), the drivers of urban development have shifted from race and state control to income, social class, and market forces.

Major challenges exist in the integration of spatial development within Cape Town, particularly regarding the development of low-income housing throughout the City and promotion of urban development within already existing low-income settlements. Developing more central low-income housing is difficult due to a number of factors: developers seeking the highest price for land; opposition from neighbouring property owners in higher income areas; and lack of support from local authorities who are trying to raise their own municipal tax bases (Turok, 2001). Perception of Cape Town's housing development is also an issue. Construction of multi-family flats would contradict the current 'social norm' characterised by single-family dwellings (Goodness & Anderson, 2013). Monetary incentives from revenue generated through housing developments and taxes stimulate construction of middle-income housing, further contributing to the urban sprawl so characteristic of Cape Town (ibid.). Because of the high cost of property throughout Cape Town, those in the low-income bracket face barriers when trying to 'move up' to better located neighbourhoods (Turok, 2001). Additional obstacles to business development in the south-east are generally related to safety and financial concerns, which include concern for social stability and safety in the area for business employees; concerns over profits; uncertainty or apprehension among investors; inadequate infrastructure for business development; risk of land invasions by squatters; conflict with local traders threatened by new business; need for community consultation and agreement prior to development; and a history of gang-related crime and rivalries in the area (ibid.). Some progress has been made in improving infrastructure and providing essential facilities to households in low-income areas but "there has been little coordination and the elements of public investment… often fail to support each other" (Cape Town City Council, 1999, p. 9).

According to the Cape Town City Council (1999, p. 8-9), "there has been no proactive, positive plan or decision-making framework to guide the spatial development of Cape Town in such a way that promotes the interests of all the city's people." As a result, Cape Town remains one of the least altered cities in the country (Turok, 2001). The approval of the Spatial Development Framework in 2011 has added credence to the push for a sustainable development framework in the City (CoCT, 2012b), yet challenges remain. Institutional practices and market forces continue to reinforce spatial division, creating costly consequences for the poor majority of the population and for the wider urban economy (ibid.). These costs are incurred by the City due to inefficient transport patterns, social instability associated with concentrated poverty, and lost investment in jobs as a result of crime and insecurity (ibid.). The Spatial Development Framework calls for urban integration, among different income levels involving a greater mix of land uses (CoCT, 2012b).

Conservation of green space within the City is disputed due to the significant burden of housing demands, which place remnant biodiversity at risk (Goodness & Anderson, 2013). According to Turok and Watson (2001), sprawling development generates major environmental impacts and makes inefficient use of land that may be valuable due to its biodiversity. Even when conservation land is available for purchase, fiscal constraints often block the way, either for the actual purchase or for sustainable management, which prevent the land from being secured (Holmes et al., 2012). The Spatial Development Framework promotes densification (CoCT, 2012b), while also conserving the vital ecosystems and biodiversity that are so unique to Cape Town (Goodness & Anderson, 2013).

3.11 Conclusion

Access to urban green space is framed by a number of social, economic, physical, and cultural issues. Cape Town faces specific challenges to the conservation of urban green space as a developing city in a post-apartheid environment with rich and valuable biodiversity. The historic spatial development of the City creates a place with deep ethnic and economic divides, which greatly impacts the appropriation and quality of public green spaces. Concerns of environmental injustice and equity of green spaces is an issue, with those living in lower income settlements having limited access to close, safe, high quality green spaces. The benefits of accessing green space are numerous, and promote an enhanced quality of life and improved physical, psychological, and emotional health for community members. Therefore, access should be guaranteed for all citizens, and as such, is specifically laid out in the 1996 Constitution of South Africa "for the benefit of present and future generations" (Constitution of the Republic of South Africa, 1996). The value of Cape Town's unique biodiversity makes the case for green space conservation even more prevalent; the City's natural assets have already experienced critical losses which affect local residents, for example in flood-prone areas. The retention of urban green spaces and promotion of biodiversity within Cape Town is crucial to the future of the City and its residents.

4 Methodology

4.1 Case Study Approach

The methodology adopted for this project was the case study approach, through the use of surveys, key informant interviews, and GIS mapping, within Cape Town, South Africa. This study attempts to use a case study approach, where use and access of a subset of urban green spaces are explored in depth, with the vision of being able to reflect on a part of a greater whole and understand City-wide trends of green space use and access across the City. In striving to address what Yin (2009) terms 'how' and 'why' questions in an attempt to understand social phenomena the work adopts a case study approach towards developing a descriptive presentation of urban green space use and access in a subset of green spaces in Cape Town, to allow broader reflections on the issue across the City, and perhaps in future, comparisons to other cities.

Eight nature reserves and conservation areas were chosen throughout the Cape Flats and Southern Suburbs, and include Die Oog Conservation Area, Edith Stephens Wetland Park, Meadowridge Common, Rondebosch Common, Rondevlei Nature Reserve, Strandfontein Birding Area, Zandvlei Nature Reserve, and Zeekoeivlei Nature Reserve. The locations were chosen to focus the study on 'a part of' the City of Cape Town, concentrating on nature reserves or conservation areas managed by the City as a means of homogenising the sample. Eight green spaces were chosen to diversify the study, as one green space would be too insular in a City so divided by its socio-economic form. In order to present a useful 'case,' a subset of eight green spaces were identified to represent the varying socio-economic neighbourhoods within the City. The number of green spaces was limited to allow an in-depth engagement in the meaningful descriptive material around green space use and access, allowing for a City-wide 'case study,' as well as a detailed examination of each individual green space. All eight of the green spaces are located in the suburbs, within or near residential areas, with varying degrees of access to public transport. The suburbs where the green spaces are located represent a sub-set of the Cape Town population, which include low and middle income in the Cape Flats and middle to high-income in the Southern Suburbs. This lack of socioeconomic integration in neighbourhoods is the legacy of apartheid planning and continues in post-apartheid spatial development (Turok, 2001). One site in the Cape Flats that was originally selected for the study could not be surveyed due to safety concerns, as advised by other reserve managers and Cape Town locals. The case study area presented in this study seeks to capture a variety of users, in diverse neighbourhoods, to illustrate how access to green spaces is determined and shaped throughout the City.

The case study approach has been considered a "valuable approach" to aid in developing theories, evaluating programmes, and developing interventions (Baxter & Jack, 2008: 544). It allows comprehensive investigations of complex issues in their real-life settings (Crowe et al., 2011). The case study approach enables the researcher to answer "how" and "why" questions, as well as to explore relationships between individuals (Yin, 2003). It may offer additional insights into what gaps in research exist, as well as recommendations for potential implementation strategies to address the research question (Crowe et al., 2011). The use of multiple sources of data, or data triangulation, has been lauded as a means of increasing the validity of a study (ibid.). In this study, a subset of eight of Cape Town's urban green spaces, all conservation areas, were chosen as the case study area, in order to explore issues of access and use of urban green space more broadly throughout the City and cities around the world. The study used key informant interviews and surveys (green space users and the public) drawing on both quantitative and qualitative measures, to ascertain the reasons people visit green spaces, and what, or if, barriers exist in green space access. Another consideration for the study, as noted in the case study approach, is the importance of making efforts to ensure anonymity and confidentiality (Crowe et al., 2011). In both key informant interviews and surveys, participants were provided with sufficient information to make an informed choice about joining the study. They were also asked to initial and date a confidentiality agreement, as per the University of Cape Town's Science Faculty Ethics Committee, to acknowledge understanding and participation in the study.

4.2 Data Collection

4.2.1 Key Informant Interviews

Key informant interviews were conducted in January and February 2013. Reserve managers and members of the 'Friends of' groups were contacted for interviews; three reserve managers and three members of the respective Friends group were interviewed. Of these, five were face-to-face, and one interview was conducted over email due to the interviewee's availability. The number of key informant interviews (6) does not equal the number of green spaces in the study (8) due to the fact that Rondevlei, Zeekoeivlei, and Strandfontein are all a part of the larger False Bay Nature Reserve and under the direction of one reserve manager. The interviews were comprised of standardised questions, and lasted one to three hours. Key informants were asked for general information on the green space with respect to size, location, a brief description of the green space and its facilities and programmes, flora and fauna species of interest, and modes of transport and access to the green space. They were also asked qualitative questions such as why users come to the green space, and what challenges are faced within the space. A blank survey can be found in Appendix 8.2.

4.2.2 Park Surveys

Data was collected over a three month period, from February to April 2013. Park surveys of visitors were conducted at each site five times, for a duration of three hours per visit. Park users were identified as people on site at the respective green space. Visits took place on different days of the week and at different times of day, to ensure randomness. Each site was visited once during the weekend, with the exception of Edith Stephens, which is not open on weekends. Data collected was both quantitative (demographics: age, gender, ethnicity, occupation, suburb of residence, mode of transport, frequency of visits) and qualitative (reasons for visiting the green space, reasons for choosing a specific mode of transport, suggestions for improvement). The method of collection was either approaching individuals within the green space, or, in the case where there was only one point of entry into the green space, at the entrance gate (Strandfontein, Zeekoeivlei, Rondevlei, and Zandvlei). Surveys lasted between five and twenty minutes. Green space users were chosen at random, and only with the consent of the individual.

4.2.3 Public Surveys

Public surveys were conducted over a period of three weeks, from April to May 2013. The public were identified as people who do not access or use the respective green space, and surveys were conducted in public commercial places located near the respective green space. The public were targeted as a means to gather information on why people were not using their local green space. Those who were identified as users of the green space were not included in the study. The locations for carrying out the surveys were determined by proximity to green space, safety, and the amount of pedestrian traffic. Each location was visited twice, with the exception of Zeekoeivlei and Strandfontein. For Zeekoeivlei and Strandfontein, two locations were chosen, due to the size of the green spaces, and visited once each. Surveys generally took place in commercial shopping areas in mid to late afternoon, to ensure both safety and increased number of potential shoppers. Due to lack of close commercial shopping areas near Edith Stephens, the public were interviewed along Lansdowne road outside of the entrance gate, as it is a high pedestrian traffic area with a number of minibus taxi and bus stops. Approximately 60 people were interviewed per location, with a total of 390 members of public surveyed for the study. For both Meadowridge Common and Die Oog, as well as Strandfontein and Zeekoeivlei, data collected included both green spaces; the public were asked whether they visited either of the two green spaces. This decision was based on the proximity of the green spaces to each other, and lack of a better alternative safe commercial area. Therefore, the public were surveyed on twelve different occasions, at 7 different locations. The location of data collection for the public, for each conservation area, was as follows:

- Die Oog: Meadowridge Shopping Centre; Corner of Howard Drive and Firgrove Way, Meadowridge. Distance to Die Oog: approximately 1.8 km.

- Edith Stephens Wetland Park: Corner of Lansdowne Rd. and Vygekraal Rd., Manenberg. Distance to Edith Stephens: approximately 300 metres.
- Meadowridge Common: Meadowridge Shopping Centre; Corner of Howard Drive and Firgrove Way, Meadowridge. Distance to Common: approximately 250 metres.
- Rondebosch Common: Silwood Centre, Corner of Campground Rd. and Park Rd., Rondebosch. Distance to Common: approximately 100 metres
- Rondevlei Nature Reserve: Corner of Victoria Rd. and 5th Ave., Grassy Park. Distance to Rondevlei: approximately 1.4 km.
- Strandfontein Birding Area:
    - Site 1: Lake Road and 5th Ave., Grassy Park. Distance to Strandfontein: approximately 7 km.
    - Site 2: Surfer's Corner, Beach Road, Muizenberg. Distance to Strandfontein: approximately 15 km.
- Zandvlei Nature Reserve: Corner of Military Rd. and Coniston Ave., Coniston Park. Distance to Zandvlei: approximately 1 km.
- Zeekoeivlei Nature Reserve:
    - Site 1: Lake Road and 5th Ave., Grassy Park. Distance to Zeekoeivlei: approximately 3.5 km.
    - Site 2: Surfer's Corner, Beach Road, Muizenberg. Distance to Zeekoeivlei: approximately 12.5 km.

The surveys were standardised and data collected was quantitative (demographics, suburb of residence, whether they visit green space) and qualitative (reason for visiting or not visiting the green space). Data for the 'reason for not visiting green space' was tallied for each green space and amassed as a whole. Each individual survey lasted between five and twenty minutes. The public were approached at random, and surveyed only with the consent of the individual.

4.2.4 Spatial Imagery

All of the maps illustrated in the dissertation were created using ArcGIS to display the size and location of the green spaces, suburbs where users reside, transportation routes, and suburbs where the public reside. Image files used were from the City of Cape Town Maps Department. The Vector data (Shapefiles), which included the suburb maps and transportation routes, were all from the City of Cape Town 2009. The aerial photos used to create the eight green space images were from the City of Cape Town March 2011.

4.3 Data Analysis

Information on each green space was collated separately and divided into categories which include: demographics: age, gender, ethnicity, occupation, and suburb of residence; transport information: mode of transport and reason for mode of transport; green space information: reason for visiting the green space and frequency of visit; and comments/suggestions for improvement of the green space. Numerical data has been analysed through descriptive statistics. Occupational categories were determined using the U.S. Department of Labor (Bureau of Labor Statistics, 2010). Because of the wide variety of occupations, only the top five occupations were used for each green space. Reasons for visiting the green spaces were simplified to twenty-two categories based on users' responses. For example, walk, jog, or bike would be placed in the category 'exercise.' Some reasons were very specific to a certain green space and were left in their own category, for example visiting the recently opened tea room in Rondevlei Nature Reserve. Users had the opportunity to give as many responses as needed to explain why they visited the green space, and therefore the number of reasons generally exceeds the number of users in the green space. All data tables reflect n = number of individuals surveyed; the analysis of these responses is based on the percentage of the total number of responses given, rather than the number of individuals surveyed.

Green space users were asked their mode of transport and, in the case of travelling by car, to explain why they chose to drive or carpool. One of the categories in mode of transport is 'car share,' which is essentially a user who arrived in a car which they do not own. It is synonymous with carpooling, where more than one person travels in a car. Users were asked to explain why they chose to travel by car, and multiple responses could be given. As is the case with 'reasons for visiting the green space,' the number of reasons given to explain why they arrived by car may exceed the number of users who used a car.

After individual park analyses, data was totalled for all green spaces, to give a more general sense of green space usership. Categories included age, gender, ethnicity, occupation, mode of transport, and reasons for visiting the green space. The top ten occupations for all eight green spaces were tallied, as well as the top ten reasons for visiting the green space. This data can be used to infer broader patterns of green space use and users throughout Cape Town, as compared to the individual data.

4.3.1 Mapping

Using GIS and mapping, eight aerial satellite maps were created to illustrate the size and location of the eight nature reserves and conservation spaces. Using the data gathered, eight suburb usage maps were also produced for each green space; the number of users surveyed and the suburb in which they lived was imported into ArcGIS and synced with the City of Cape Town suburb maps. For each green space, the maps show the

percentage of green space users residing in the various suburbs around Cape Town and demonstrate the distances users travel to reach specific green spaces. In addition, eight transport maps were created using layers from the City of Cape Town and included provincially run minibus taxi routes and Golden Arrow buses, and nationally run train lines. These maps indicate the ease or difficulty of accessing each green space through public transport. Six public suburb maps were also generated. Because people were generally interviewed at commercial or retail centres, it is possible they may reside in a distant suburb and the likelihood of using a local green space in the area may be slim. The public suburb maps show what percentages of the public live in each suburb, in relation to each of the eight green spaces.

4.4 Limitations

The case study approach is not without its limitations. Due to a large volume of data, as well as time restrictions, the depth of analysis may be more limited than desired (Crowe et al., 2011). The sheer volume of data may also pose a challenge, in remaining meticulous about what data to include and analyse and what to discard (ibid.). Other critiques of the case study approach include a lack of scientific accuracy, issues of generalisation and whether results can be transferable in other settings (ibid.). It is crucial in this study to emphasise transparency throughout the research process as well as the validity of respondent data to address these concerns.

Respondent bias may also be of concern in the data collection, as people may give responses that they assume the researcher wants to hear, or may fear repercussions for telling the truth. Social desirability is the inclination of an individual to deny socially undesirable behaviours and to admit to socially desirable ones (Randall & Fernandes, 1991). Certain illegal activities are known to occur within a few of the green spaces in the study, yet only one person interviewed (in a public survey) acknowledged visiting green space to engage in such activities. In the case of Zeekoeivlei, security guards revealed that some of the users entering the nature reserve were not visiting for reasons given, such as to *braai*[1] or for nature appreciation, but rather prostitution and drug use. Response bias may also occur when an individual is uncomfortable revealing the truth, such as in identifying one's occupation, i.e. claiming to be self-employed rather than unemployed or homeless. However, much of the data gathered was more straightforward, such as demographic information, suburb of residence, and mode of transport, of which most could be ascertained through observation. It is important to recognise, though, that response bias does exist, and may jeopardise some of the validity of the data.

Another limitation exists within the GIS data layers. The City of Cape Town suburb maps are provided by the City and are divided in a way that is not necessarily intuitive to the resident. For example, larger suburbs such

[1] Afrikaans word meaning barbecue or grill

as Khayelitsha are divided into sub-suburbs; the area depicted on the maps in this study shows Khayelitsha Central Business District (CBD), as it is the most central of the subdivisions. Residents to Khayelitsha are more likely to state that they are from the suburb rather than one of its subdivisions. Alternately, some distinct neighbourhoods are grouped within one suburb and while the user may state a more specific location, it is mapped as part of whole. One example of this is the neighbourhood of Marina da Gama, where a number of users at Zandvlei Park Island reside. Marina da Gama falls under the suburb of Muizenberg. Regardless of the breakdown of the City's suburbs, the maps assist in visualising where users come from and how far they travel.

Language was an additional limitation in conducting surveys. English was the language spoken during the surveys, yet other languages, particularly Afrikaans, are common in Cape Town. Gathering information from some users and the public was a challenge as there was a language barrier; in these cases, limited information was delivered, or the survey could not be conducted. This was a more noticeable issue with public surveys than user surveys. In general, however, almost all park surveys and the majority of public surveys were conducted without difficulty.

5 Study Site Park Descriptions

5.1 General Information

The City of Cape Town falls within the Cape Floristic Region (CFR) and is home to almost one third of the threatened plants in the region (CoCT, 2008). With its exceptional biodiversity, many of the remnants of natural vegetation in the CFR, especially in the lowlands, contain the highest number of threatened plant species per area relative to any other place on earth (Wood et al., 1994). Critically endangered plants can be found along roads, pavements, indigenous gardens, sports fields, and public open spaces (CoCT, 2010). Action to protect these species is slow-moving despite efforts made to raise awareness. In the late 1980s and 1990s, flora and vegetation surveys were conducted which identified important biodiversity sites within the City but little action was taken and many natural remnants were lost to developments in the early 1990s (CoCT, 2008). Further reports and studies highlighted sites of critical importance to Cape Town's biodiversity leading to the Biodiversity Strategy, which focuses on the planning, development, and implementation of a network of natural vegetation remnants (ibid.). Since 2002, City-owned sites managed by qualified conservators has increased from four to twenty-one, and the number of City-managed sites now stands at thirty-one (CoCT, 2008; CoCT, 2010). Still, the City faces challenges due to insufficient resources being allocated to biodiversity management by provincial and local government levels and inadequate operational budgets (CoCT, 2008). Conservation of the City's biodiversity and green spaces is crucial to the future of the fragile ecosystems within the CFR.

The following eight green spaces were chosen due to their designation as conservation areas in Cape Town. Each location has a varying degree of valuable biodiversity, including both flora and fauna, which must be protected. The following section provides a brief description of each green space, including size, location, available facilities and programmes, pertinent site-specific information, animal and plant species of interest, and public transport access routes. In many cases, information was gathered through personal communications with reserve managers or members of the Friends of groups, and where relevant to the study site description, these comments have been included. In addition, suggestions for improvements by surveyed users are incorporated in this section. While the eight green spaces are all valuable biodiversity sites within Cape Town, they each are of differing and unique character and service different interests within the community.

FIGURE 1: Aerial Photo of Die Oog Conservation Area
Source: City o f Cape Town Maps Department, March 2011

FIGURE 2: Die Oog Conservation Area Site Pictures
(A) Entrance sign post (B) Artificial island and pond (C) Protected diversity area (D) Path and bench (E) Bench and table (F) Educational sign post
Photo credit: Julia Milliken

5.2 Die Oog Conservation Area

Die Oog is a small 1 hectare green space located in Bergvleit, near the corner of Lake View Road and Midwood Avenue. It is nestled within a quiet residential community, surrounded by homes and open green space. Die Oog hosts about a dozen visitors per day, with an increase on the weekends. The conservation area is fenced in and locked in the evening hours; times vary seasonally by the sunset. It encases a pond which attracts various types of birds, amphibians, and small mammals. The artificial island in the middle of the pond may host over 1,000 birds including yellow-billed ducks (*Anas undulate*), Egyptian geese (*Alopochen aegyptiacus*), hadeda ibis (*Bostrychia hagedash*), and reed cormorant (*Phalarocorax africanus*) (CoCT, 2012a). Die Oog is also host to the Western Leopard Toad (*Amietophrynus pantherinus*) an endangered amphibian species endemic to the Western Cape (SA-FRoG, 2010). Given the size of the green space, the facilities are limited and consist of a small walking path and various benches around the pond.

Die Oog mainly attracts local residents in the surrounding neighbourhoods. The Friends group has a strong community presence, and is comprised of about 50 local residents, though only a few are active (member of Friends of Die Oog, personal communication, 31 Jan 2012). Members of the Friends of Die Oog run an annual event for Grade 4 children, as well as programmes for Local Scouts and Cubs. Future goals for the conservation area involve working with the City Parks Department and Biodiversity departments to maintain the quality of Die Oog (ibid.). Some challenges faced are obtaining funding and support from the Council, and keeping community members involved and motivated (ibid.). Green space users made suggestions for improvements to Die Oog, including procurement of additional funding from the Council, additional facilities such as toilets and seating, better signage, and enhanced security in the area.

Public transport access is limited at Die Oog. The closest train station is located off of Main Road, Heathfield station, approximately 3 kilometres distance. Minibus taxi routes do not service the neighbourhood; Main Road in Heathfield is the nearest minibus taxi stop which is approximately 2 kilometres distance. Access to Die Oog is most likely by private car or by foot.

5.3 Edith Stephens Wetland Park

Edith Stephens is a 59 hectare park located off of Lansdowne Road, in the suburb of Philippi. The area is largely industrial and agricultural, with a few nearby neighbourhoods of Manenberg and Phola Park. Edith Stephens contains a small manmade reservoir, with an island in the centre which attracts a large variety of birds and waterfowl. The seasonal wetland provides an important habitat for breeding waterfowl, such as Cape shoveller (*Anas smithii*), yellow-billed duck (*Anas undulata*), and African snipe (*Gallinago nigipennis*) (CoCT, 2010). Approximately 95 bird species have been recorded at Edith Stephens, as well as a number of reptiles,

FIGURE 3: Aerial Photo of Edith Stephens Wetland Park
Source: City o f Cape Town Maps Department, March 2011

FIGURE 4: Edith Stephens Wetland Park Site Pictures
(A) Main entrance (B) Playground area (C) Entrance sign (D) Plant nursery (E) Overlook (and concert platform) to seasonal wetland area (F) Seasonal wetland area
Photo credit: Julia Milliken

mammals, and amphibians (ibid.). The vegetation type is a transition from Cape dune strandveld to Cape Flats sand fynbos, both of which are highly threatened; seven Red Data plant species can be found as well (ibid.).

Facilities include gardens, a plant nursery, a wetland area and benches, a platform for concerts, a small playground, footpaths, a main office building and conference rooms, and an education building which hosts the Prima Science Programme. The main office building is also available for booking events, and is used by the local community for conferences, weddings, church functions, and birthday parties. Maintenance of facilities is lacking: the small playground is in poor condition and could be expanded and improved; the footpaths no longer exist as they were allegedly burned in a fire during riots in 2012. Suggested improvements by surveyed users included enhanced facilities and grounds maintenance, to attract more users to Edith Stephens. The number of visitors declined in the first quarter of 2013, by nearly 50%, with approximately 500 visitors in the last quarter of 2012 (October-December) (park employee, personal communication, 4 Feb 2013). This is largely due to recent vandalism and theft. The number of visitors includes the teacher development workshops run by the Prima Science Programme, held in the afternoons two to three times per week.

Other programmes held at Edith Stephens include environmental education, leadership development, and personal development programmes. Due to the low biodiversity rate within the green space, Edith Stephens receives limited funding from the City, as the budget is determined by vegetation and biodiversity value, and must rely on funding from outside donors such as NGOs and social groups (park employee, personal communication, 4 Feb 2013). Fortunately, there are a number of locally based NGOs and clubs who have partnered with Edith Stephens to promote community development through various community presentations. Yet challenges still remain for the small wetland park, according to a park employee (personal communication, 4 Feb 2013). Developing appropriate infrastructure and protecting such infrastructure for community needs is a struggle, as well as attracting more users to the green space. Funding remains a problem, particularly when conflicts between NGOs arise; the rising number of NGOs in local neighbourhoods may result in competition for resources. Crime within Edith Stephens and the surrounding areas poses problems for users concerned over safety and security measures. Vagrancy, theft of fencing and sign posts, drug use, prostitution, and mugging were specifically mentioned as challenges faced in Edith Stephens, as well as struggles with law enforcement officials to implement more regulation (park employee, personal communication, 4 Feb 2013). In addition, housing challenges within Cape Town account for backyard dwellers and vagrants in the park, which highlights a distinct obstacle in the City regarding conservation versus housing needs (ibid.).

Public transportation around Edith Stephens consists of bus and minibus taxi routes along Lansdowne Road, where the green space is located. The stops are within 100 metres of the entrance gate. According to a park employee, however, most visitors travel via personal car or by foot (personal communication, 4 Feb 2013).

FIGURE 5: Aerial Photo of Meadowridge Common
Source: City o f Cape Town Maps Department, March 2011

FIGURE 6: Meadowridge Common Site Pictures
(A) Football pitch (B)Informational signage (C) Signage on biodiversity (D) Bench and pathways (E) Educational sign posts (F) Common with Table Mountain in background
Photo credit: Julia Milliken

5.4 Meadowridge Common

Meadowridge Common is a small 7.9 hectare green space within the suburb of Meadowridge, off of Faraday Way. The Common is home to as many as 137 different flowering plant species, including four that are endangered, and holds one of the last remnants of the Cape Flats sand fynbos. The area is prominently covered by pine trees (*Pinus sp*.) and kikuyu grass (*Pennisetum clandestinum*), as well as annual weeds, which suppress the natural vegetation (CoCT, 2010; CoCT, 2012a). Various insects, birds, and amphibians have been detected within the Common, including the endangered Cape rain frog (*Breviceps gibbosus*). It is managed by the City of Cape Town, along with the Friends group, who are responsible for the information posts and a certain degree of park maintenance. They also host programmes in the community with guided walks during September's wildflower season, post articles in the press about upcoming events, and organise 'clean ups.'

Challenges exist within the Common and are of varied nature. Despite the sensitive nature of the vegetation in the Common, there are issues around the planting of invasive species by local residents, which stifle the growth of the native endangered plants, and the removal of native plants for home gardens (member of the Friends group, personal communication, 1 Feb 2013). This has caused tension between the Friends group and the community due to the conflict between the perceived beauty of the place and the preservation of endangered species (ibid.). In addition, vagrancy and littering may compromise the nature of the plants, and police enforcement is not consistent (ibid.). Users had a number of suggestions for improving the Common, although some conflicting. While some were happy to leave the Common as is, others advocated for the clearing of the pine trees to create space to plant indigenous trees. Maintenance of the Common was important to most green space users, and it was generally felt that the council needs to be more active and involved within Meadowridge, with regard to clearing of vegetation and rubbish, as well as an improvement in facilities.

Visitors can access Meadowridge Common by train, bus, or minibus taxi, followed by a twenty minute walk. The train line stops at Diep River, about 1.7 kilometres from the Common. Golden Arrow buses and minibus taxis stop along Main Road in Diep River, approximately 1.5 kilometres distance. According to one of the members of the Friends of Meadowridge, most visitors access the Common with their own private car or by foot (personal communication, 1 Feb 2013).

5.5 Rondebosch Common

Rondebosch Common is located in a residential area in the suburb of Rondebosch, surrounded by Campground Road, Park Road, Milner Road, and Klipfontein Road; it is about 40 hectares in size. A natural remnant of the critically endangered Cape Flats fynbos exists within the Common, as well as patches of renosterveld, and over 300 plant species have been identified on the site (CoCT, 2012a). Nine of those species feature on the

FIGURE 7: Aerial Photo of Rondebosch Common
Source: City o f Cape Town Maps Department, March 2011

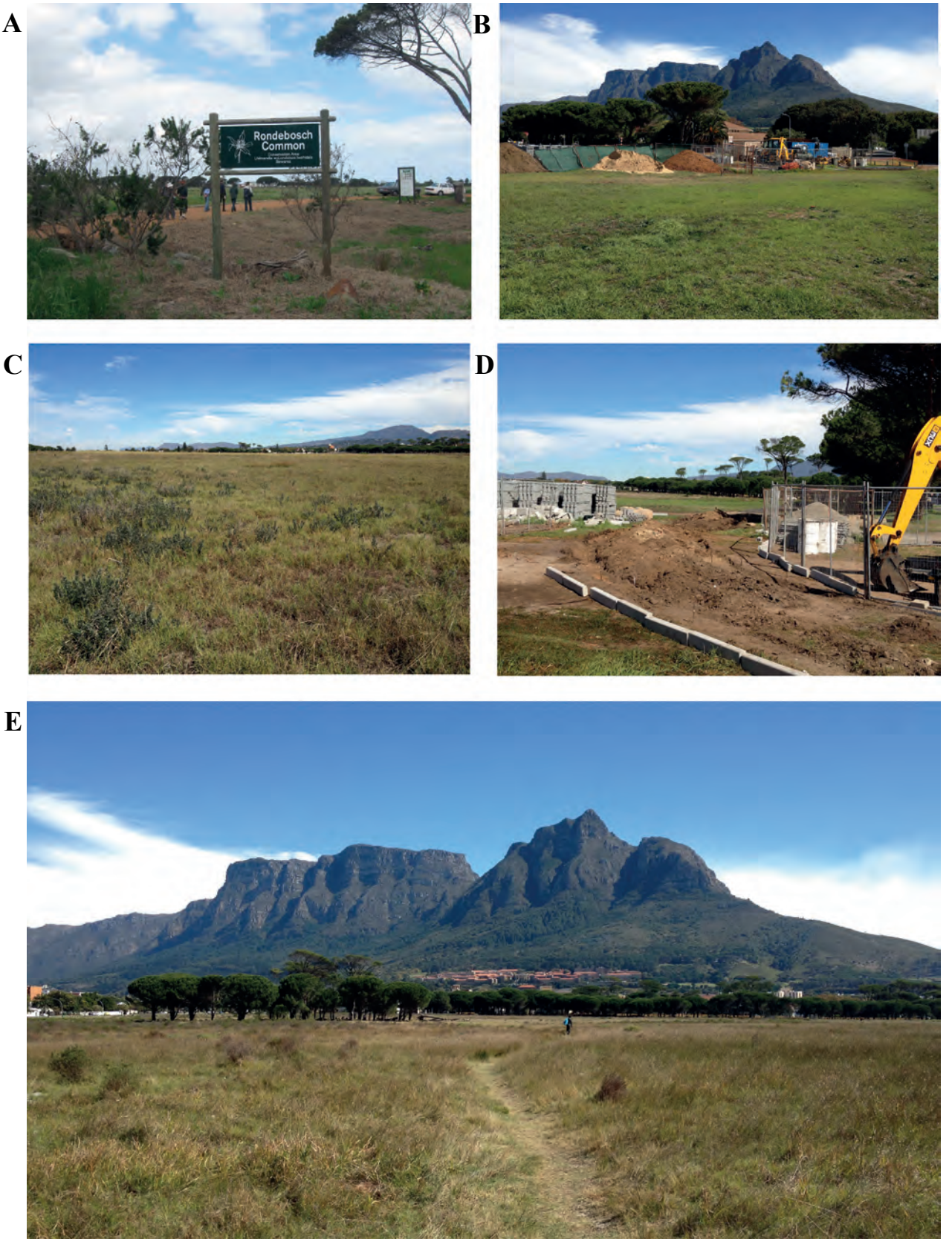


FIGURE 8: Rondebosch Common Site Pictures
(A) Signage (B) Construction site (C) Open space (D) Construction zone for new pathway (E) Walking path with Table Mountain in background
Photo credit: Julia Milliken

International Union for Conservation of Nature (IUCN) Red List, two of which include variegated Ixia, *Ixia monadelpha*, and silver sweet pea bush, *Podalyria sericea* (ibid.). The Common is also a seasonal wetland and up to 110 bird species have been recorded here (ibid.).

The Common is mainly an open field, with a series of dirt walking paths within and a paved sidewalk surrounding the boundary, which is currently under construction. It services numerous local residents who utilise it for exercise purposes. The Common also contains pine trees (*Pinus sp.*) in two main clusters, which provide shade and a gathering area for users. The Friends of Rondebosch Common is very active in maintaining and improving the site, doing tasks such as rubbish clean up and fire control. They control the spread of alien vegetation, organise spring walks and information boards, and are also busy compiling a publication on the history, flora, and fauna of the Common.

Challenges exist in Rondebosch Common with rubbish removal, particularly dog waste. Theft of plants or other natural materials (stones) and illegal dumping of plant waste, which has the potential to invite new invasive species into this conservation site, are concerns. When surveying users in Rondebosch, the most common response was that people were happy with the improvements being made to the pathway around the Common. Requests for more facilities were also quite widespread, such as toilets and water taps, and improved rubbish removal. There were mixed positions on the vegetation in the Common, with some users calling for more shade trees, flowers, or grass maintenance. One local user, who lives in the neighbourhood, brought another perspective, stating Rondebosch Common is a "waste of commercial land." He felt the neighbourhood would benefit more if the Common was converted to a residential or commercial area, in order to "bring in diversity to a predominantly white neighbourhood" (personal communication, 2013).

Public transportation to Rondebosch Common consists of Golden Arrow buses, minibus taxis, and train access. Buses and minibuses run along Main Road in Rondebosch, at a distance of 900 metres from the green space. The Rondebosch train station is approximately 750 metres distance.

5.6 Rondevlei Nature Reserve

Rondevlei Nature Reserve is located in Grassy Park, at the corner of Perth Road and Fishermans Walk. It is part of the False Bay Nature Reserve, which is comprised of six sections. Rondevlei covers 290 hectares, and consists of a permanent wetland with Cape Flats sand fynbos in the north, and seasonal wetlands and Cape Flats dune strandveld in the south (CoCT, 2012a). The area was formally a bird sanctuary, and reclassified as a nature reserve. The reserve consists of a 1 kilometre walking path, dotted with six bird hides and two look-out towers, around the shores of the *vlei*, or coastal lake. Rondevlei is the only green space in the study that charges an entrance fee, which costs R12 for adults (approximately $1.20) and R6 for children ($0.60). Over 240

FIGURE 9: Aerial Photo of Rondevlei Nature Reserve
Source: City o f Cape Town Maps Department, March 2011

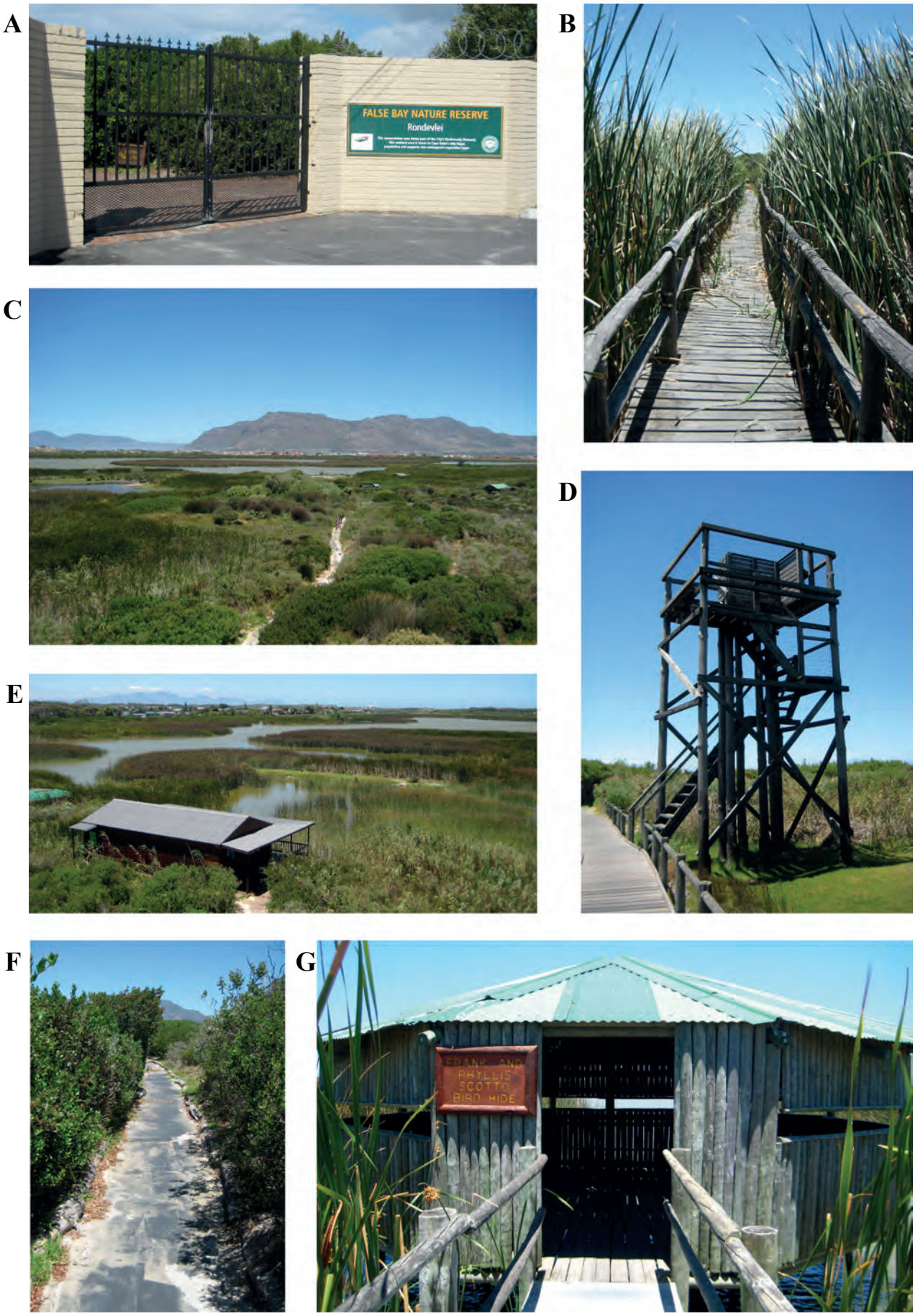


FIGURE 10: Rondevlei Nature Reserve Site Pictures

(A) Entrance post (B) Walking path (C) View of Rondevlei from the look-out tower (D) Look-out Tower (E) Recently opened tea room and the vlei (F) Walking path (F) Bird hide

Photo credit: Julia Milliken

different bird species have been spotted at Rondevlei, and include the White Pelican (*Pelecanus onocrotalus*), Greater Flamingo (*Phoenicopterus roseus*), and African Spoonbill (*Platalea alba*) (RNR, 2013). A variety of reptiles, amphibians, and small mammals such as the Cape Clawless Otter (*Anonyx capensis*) and Cape Grey Mongoose (*Herpestes pulverulentus*) can also be seen regularly (ibid.). Rondevlei is well-known for re-introducing hippopotami (*Hippopotamu amphibus*) into the reserve in 1982 (ibid.). The reserve is host to 320 plant species, including 17 endangered and two endemic (ibid.).

The reserve boasts a number of facilities such as a recently opened tea room and the Leonard Gill museum. Educational programmes are held daily in Rondevlei with local school groups. The lecture theatre and resource centre are used for educational purposes, and are privately run by Imvubu Nature Tours, which also organises overnight island trips. There is a small 1 hectare picnic area, with tables and benches. The reserve is considering redeveloping its facilities to attract more viewers, currently drawing approximately 19,000 people per year (reserve employee, personal communication, 14 Feb 2013). The Friends of Rondevlei run the retail nursery of which 10% of the proceeds go to the reserve. They also hold events such as plays and environmental education programmes. Community involvement as a whole, though, is limited. Because of Rondevlei's status as a bird sanctuary, visitors travel from all over Cape Town, as well as international travellers. More local visitors are expected due to the recently established tea room, according to reserve staff (personal communication, 14 Feb 2013).

Challenges that exist in Rondevlei are largely to do with increasing visitors to the reserve and improving community involvement (ibid.). Many residents around Grassy Park are unaware of the reserve, and what programmes it offers (ibid.). Security issues may detract users, given the location of Rondevlei as well as reports of drug use in the nearby Vryground community (ibid.). In addition, there are squatters living on the western border of Rondevlei; housing issues are at the forefront of Cape Town's urban planning struggles over land conservation (ibid.). The majority of users in Rondevlei seemed generally happy with the condition of the nature reserve, though a few called for improvements to the green space, in regard to facilities, with interest in the potential quality of the recently opened tea room.

Public transport to the reserve can be accessed from Fifth Avenue and Prince George's Drive via minibus taxi or Golden Arrow bus. Prince George's Drive stop is about 1.5 kilometres distance, while Fifth Avenue is approximately 1 kilometre. The nearest train station is Retreat Station, off Chad Road in Retreat. A minibus taxi rank is located on Concert Boulevard, approximately 250 metres away.

FIGURE 11: Aerial Photo of Strandfontein Birding Area
Source: City o f Cape Town Maps Department, March 2011

FIGURE 12: Strandfontein Birding Area Site Pictures

(A) Filtration pond with flamingos (B) Entrance sign (C) View of the birding area (D) Filtration pond (E) Dirt driveway around Strandfontein (F) Another road through area (G) Bridge to bird viewing spot

Photo credit: Julia Milliken

5.7 Strandfontein Birding Area

Strandfontein Birding Area is also a part of the False Bay Nature Reserve, and is located off of Strandfontein Road, in Pelikan Park. The green space can be accessed through the main gate of Zeekoeivlei Nature Reserve, adjacent to the Cape Flats Waste Water Treatment Works (WWTW) facilities. Once a naturally occurring *vlei*, the area was converted into a series of filtration ponds and is designated as a birding area, controlled and managed by the City of Cape Town. The Cape Flats WWTW handles approximately 40% of Cape Town's sewage effluent, and the high nutrient levels in the maturation ponds encourage the growth of plankton, making them an ideal feeding ground for birds. Strandfontein is approximately 380 hectares, comprised of permanent ponds, seasonal ponds, canals, reedbeds, and sludgebeds, as well as grasslands, dune vegetation, and patches of strandveld. Dirt roads circulate throughout the many ponds, with some scattered benches and small bridges to view the birds. Strandfontein is rated as one of the top three waterbird sites in the southwestern Cape, and one of the top five sites in South Africa (Kaletja-Summers et al., 2001). The area supports an average of 15,000 birds during the summer and 8,000 in the winter, with a variety of about 200 different bird species (ibid.). Nine Red Data species have also been recorded in Strandfontein and include the Bank Cormorant (*Phalacrocorax neglectus*), African Marsh Harrier (*Circus ranivorus*), Great White Pelican (*Pelecanus onocrotalus*), and Greater Flamingo (*Phoenicopterus roseus*) (Barnes, 2002).

One of the challenges of the green space includes improving access to the space, as it is difficult for people without a private car to reach the space. Many people in the local community are unaware that Strandfontein exists, or what the reserve offers. Better signage around Strandfontein could help visitors navigate the various roadways and paths within the reserve. In addition, some users spoke about the overgrowth of water hyacinth (*Eichhornia crassipes*) in a few of the ponds, or pans, which obstruct views of the birds, and is an invasive species in South Africa. Other challenges include managing the quality of the water and variety of vegetation to ensure healthy feeding grounds for birds. Users called for an improvement in the facilities in Strandfontein, including the construction of toilets, a picnic area, and bird hides.

Minibus taxis and buses travel along Strandfontein Road, approximately 5 kilometres distance from the entrance to Strandfontein. The majority of visitors access the green space by private car.

5.8 Zandvlei Nature Reserve

Zandvlei Nature Reserve is made up of a number of different patches of land covering 200 hectares, surrounding Zandvlei estuary. For the purposes of this study, two areas were considered: the section by the main office buildings and Park Island. The main office area can be accessed from a gravel road off of Coniston Avenue, in Coniston Park. Park Island is reachable through Marina da Gama, at the end of Park Island Way, off of Prince

FIGURE 13: Aerial Photo of Zandvlei Nature Reserve
Source: City o f Cape Town Maps Department, March 2011

FIGURE 14: Zandvlei Nature Reserve Site Pictures

(A) Pathway on main office area (B) View of Zandvlei from main office area (C) Rubbish along coast of Zandvlei Park Island (D) Entrance sign to main office area (E) View of Zandvlei Park Island (and Marina da Gama homes in background) (F) Bird hide on Zandvlei Park Island (G) Entrance sign to Zandvlei Park Island

Photo credit: Julia Milliken

George Drive. Both areas contain walking paths which run along the coast of the *vlei*, benches, and bird hides. The main office area also has an information and education centre, and toilet facilities.

Zandvlei is the only functioning estuary on the False Bay coast and supports 25 types of indigenous fish such as the Southern mullet (*Liza richardsonii*), leervis (*Lichia amia*), and the critically endangered white steenbras (*Lithognathus lithognathus*) (CoCT, 2010). The wetland habitat also provides feeding grounds for almost 150 bird species, 18 reptiles, and small mammals (ibid.). Some 210 different plant species can be found within Zandvlei, which is part of the Cape Flats dune strandveld vegetation (ibid.).

Zandvlei offers a number of different education programmes for school groups and adults, as well as school visits by the local education officer. Approximately 4,500 people participate in the education programmes each year. Zandvlei also promotes education for its staff members through the Expanded Public Works Programme (EPWP), which allows the reserve to hire individuals on rolling contracts of three month durations; the contracts can be renewed to build capacity of staff through appropriate training and workshops (reserve employee, personal communication, 14 Feb 2013).

Challenges vary in the two areas of Zandvlei (personal communication, 14 Feb 2013). On Park Island, located within the neighbourhood of Marina da Gama, security is prevalent and the entrance gate is locked every night around sundown. Issues of rubbish clean up, particularly along the coast where waste accumulates due to wind and water currents, and park maintenance are main concerns. Improvement of facilities such as benches and pathways, and the construction of new recreational facilities were suggested by green space users to improve the space. Funding is a concern, as little money comes from the Council; the community within Marina da Gama is largely responsible for initiating improvements and managing the reserve. In the main office area, struggles with crime abound. Drug dealing and drug use (generally marijuana and a substance referred to locally as *tik*, or crystal meth) are a common problem, as well as theft, mugging, and murder. Environmental crime also stands out as a challenge, with community members removing plants for medicinal use, poaching of small antelope (Common Duiker, Grysbok, and Steenbok), and illegal dumping.

Public transport to the sites is varied. At the main office location, minibus taxis and buses travel along Military Road, about 700 metres from the entrance gate. The nearest train station is Steenberg station, about 1.8 kilometres distance. Park Island can be reached via minibus taxi or bus along Prince George Drive, about 500 metres from the reserve entrance. The nearest train station is also Steenberg station, and is approximately 3.5 kilometres distance. The most common forms of transport are either private car or walking, particularly at Park Island.

FIGURE 15: Aerial Photo of Zeekoeivlei Nature Reserve
Source: City o f Cape Town Maps Department, March 2011

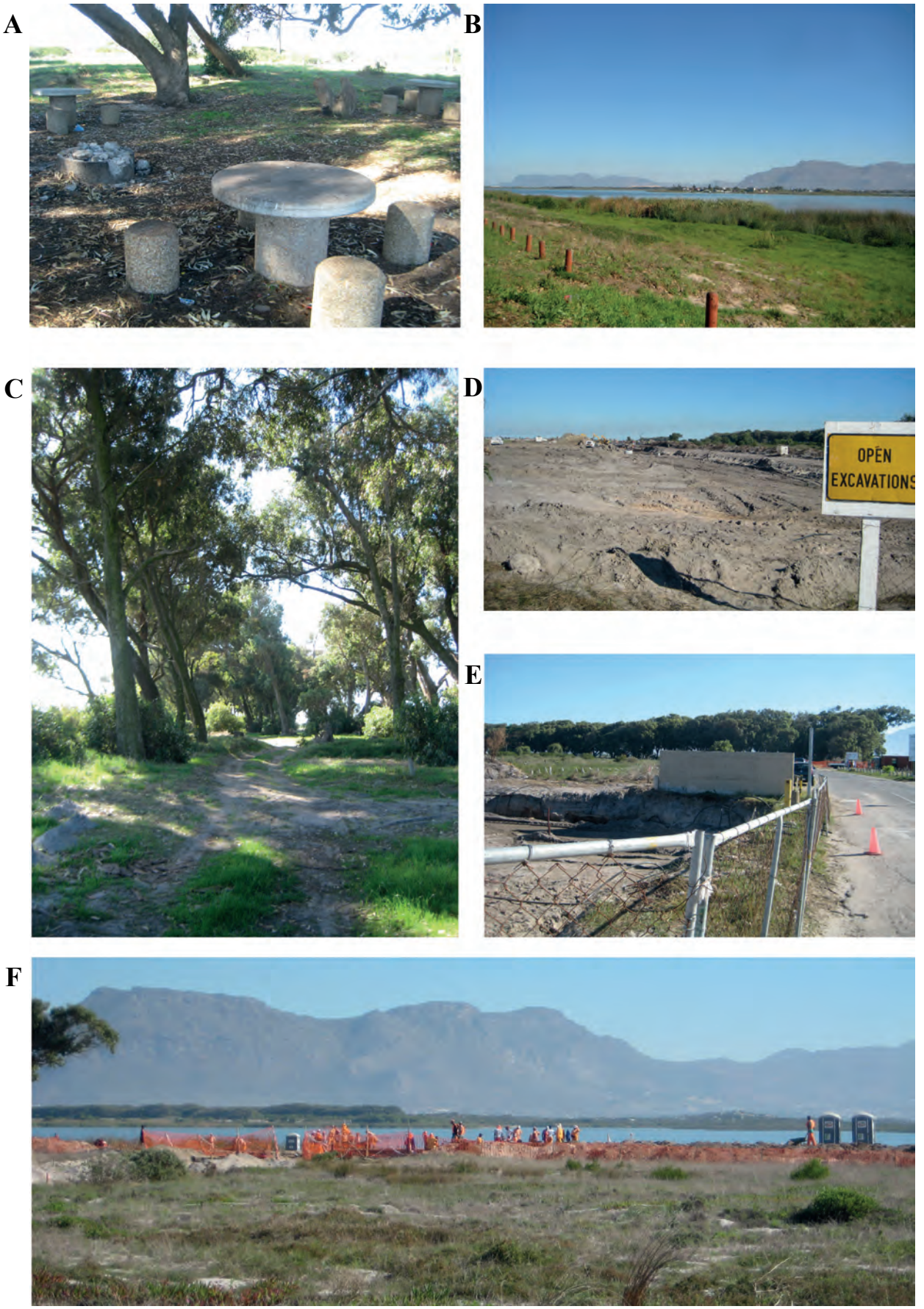


FIGURE 16: Zeekoeivlei Nature Reserve Site Pictures

(A) Braai area (B) View of the vlei (C) Pathway around Zeekoeivlei (D) Construction for housing developments (E) Old entrance sign and construction (F) Construction of new car park, with vlei and Table Mountain Chain in background

Photo credit: Julia Milliken

5.9 Zeekoeivlei Nature Reserve

Zeekoeivlei is another part of the False Bay Nature Reserve, located off Zeekoeivlei Road, in Pelikan Park, and contains the largest natural inland water body in the City (CoCT, 2010). It encompasses 344 hectares and attracts 89,000 visitors per year (ibid.). A number of bird species including the Great White Pelican (*Pelecanus onocrotalus*) and Greater Flamingo (*Phoenicopterus roseus)* can be found within the reserve. Zeekoeivlei is surrounded by low coastal dunes with Cape Flats dune strandveld and Cape Flat sand fynbos, as well as wetland and open water habitats. The nature reserve contains a large number of *braai* spots for picnicking, as well as spaces for ball playing, and fishing. Construction is currently being undertaken to improve facilities within the reserve, through funding from the national government (reserve employee, personal communication, 14 Feb 2013). The *vlei* is accessible by boat, and the reserve attracts visitors for various water sports. Zeekoeivlei runs educational programmes with school age children, as well as overnight trips. They have a recently upgraded office building with conference facilities available for rent. According to a reserve employee, the main priorities at Zeekoeivlei are biodiversity and conservation, closely followed by environmental education, recreation, and appropriate tourism (personal communication, 14 Feb 2013).

Zeekoeivlei faces similar challenges to those encountered by the other green spaces within the study. About 180 people live on the reserve, in Pelikan Heights, and struggles occur between balancing park management with community use of the land. Dumping of waste and rubbish is a constant problem around the community, as well as within the nature reserve. According to reserve employee, the orientation of houses in the neighbouring communities around the *vlei* may have a direct effect on the perception of space (personal communication, 14 Feb 2013). The urban effect of living on or near a nature reserve is observable through the orientation of houses in these neighbourhoods, whether they are backed up on the *vlei* or facing it, which may affect how they treat the space (ibid). Theft, property damage, and vandalism are all problems within Zeekoeivlei, despite security working in the reserve 24 hours per day. Poaching of animals in the reserve is also an issue. Prostitution and drug use are everyday challenges for green space users and staff.

A general trend in comments from users surveyed regarding the status of the reserve was a desire for better facilities within Zeekoeivlei. Users called for an increase in toilet facilities, water taps, playground facilities, improved *braai* spots, more benches, better lighting, improved parking access, educational information boards, and a dock or bridge built for easier fishing access. Parents requested more activities for children “to keep them out of trouble and away from drugs” (surveys, 2013). Users were also concerned with the maintenance of the reserve and rubbish removal, as well as safety and security issues.

Public transport to Zeekoeivlei is in the form of minibus taxis and buses along Strandfontein Road, approximately 800 metres from the entrance gate. The nearest train station is the Southfield station, which is

about 7 kilometres from the reserve entrance. The most common form of transport to Zeekoeivlei is via private car.

5.10 Conclusion

The eight green spaces in the study are of varying sizes and character, with diverse facilities which appeal to people of differing interests. They are predominantly in the south and east areas of the City, in outer-lying suburbs away from the CBD, and generally in residential neighbourhoods. Access and use of these green spaces varies, often depending on location, safety, interest, and means of transport. Each green space is designated as a nature reserve or conservation area, and has valuable biodiversity, in either flora or fauna, which must be protected and conserved within the City.

6 Results

6.1 Introduction

The Results Chapter is presented both across reserves and by individual reserves. Across reserves findings are presented by theme, including proximity, transport, safety and security, effects of spatial development, park interest, and information barriers. These themes will be further addressed in the Discussion Chapter. Individual reserve data is presented independently by reserve, with eight sections for each green space. Presenting the data across reserves and by individual reserves allows for two different commentaries on the data. Across reserve data focuses largely on city-wide trends and patterns, which may prove to be useful for comparative purposes in the future. Individual reserve data provides a snapshot of a particular green space, within a distinct community and distinct city, illuminating the reasons for these city-wide trends and patterns by allowing for detailed analysis.

Across the eight green spaces, 672 users were surveyed. The breakdown of green space users at the individual reserves is presented in section 6.3 Individual Reserves. A total of 390 people were interviewed using 'public' surveys. Of those 390, 73 people acknowledged use of one of the eight green spaces included in the study; therefore, data includes analysis of 317 individuals.

6.2 Across Reserves

6.2.1 Proximity

The results illustrate that the majority of users did not travel far to reach their respective green space. In Die Oog, based on the Park Users Suburbs map, the majority of users came from the surrounding neighbourhoods; 82% of users reside in adjacent suburbs of the conservation area (Fig. 17e). In Edith Stephens, the majority of users came from the nearby suburb of Mitchell's Plain (57%) (Fig. 18e), and at Meadowridge Common, 72% of users came from the two nearest suburbs (Fig. 19e). Green space users at Rondebosch Common were generally from the Southern suburbs, with 52% from the four adjacent suburbs to the Common (Fig. 20e). In Rondevlei, users predominantly came from suburbs surrounding the nature reserve, with 60% of users from the nearest three suburbs (Fig. 21e). Similarly, over 75% of green spaces users at Zandvlei reside in Muizenberg, the neighbourhood where Zandvlei Park Island is located (Fig 23e). In Zeekeoivlei, 29% of users reported living in the two closest suburbs to the nature reserve. In contrast, Strandfontein attracted a number of visitors from outside of the Cape Town area, such as Scotland, England, and Hermanus, South Africa. The majority of other users (40%) came from the Southern Suburbs, not in neighbourhoods adjacent to the birding area (Fig. 22e).

A total of 672 green spaces users were surveyed. Nearly 55% of all total green space users (n=392) live within neighbouring suburbs of the respective green space, falling within one kilometre distance from the space. When the distance is increased to two kilometres, over 80% of users fall within the allotted suburbs (n=561). The majority of users surveyed in the study live within a two kilometre proximity of the respective green space. Interestingly, for public surveys, distance was one of the top five reasons listed for not visiting the green space, with 10% of respondents reporting (Table 1).

Table 1: Public Reasons for Not Visiting Park (n=317)
Source: As gathered in this study

Reasons for Not Visiting Park	Percentages
Unaware of the park	20%
Doesn't suit interests	16%
No time	13%
Go to other parks/beaches	12%
Distance	10%
Unaware of what park offers	7%
Don't know	6%
Safety concerns	6%
Stay at home	4%
Used to go	4%
Inaccessible	1%
Cost	1%
Only here for shopping	0.3%

6.2.2 Transport

The majority of green space users travelled to the green spaces by car (owned or shared), and very few opted to take public transport. In Die Oog, over half of green space users (51%) accessed the location via private car (own or shared) (Fig. 17f). Similarly, in Edith Stephens, a majority of users accessed the green space via private car (owned or shared: 86%), (Fig. 18f). Both Meadowridge Common and Rondebosch Common revealed comparable trends, with 57% and 79% of users, respectively, travelling by owned or shared car (Fig. 19f, Fig. 20f). In Rondevlei, in contrast to the other green spaces, almost half of users travelled by bus, which can be attributed to various group outings (Fig. 21f). Most of the remainder arrived by car (46%). All of the visitors at Strandfontein came via car (owned or shared) (Fig. 22f). The majority of users (69%) travelled to Zandvlei by car (owned or shared) (Fig. 23f), as well as in Zeekoeivlei, where a large percentage (88%) of users accessed the nature reserve via car (owned or shared) (Fig. 24f).

Almost two-thirds of total green space users travelled by car (owned or shared), while nearly one-fifth arrived by foot (Table 2). When users were asked why they chose to travel by car, over one quarter (28%) mentioned

convenience while 22% cited distance. Traveling with dogs (15%) and children (8%) accounted for nearly another quarter. Almost one-tenth of users who drove (9%) explained that there was no other way to reach the green space, or no decent public transport. Using public transport was extremely rare. While 10% used buses to travel, this percentage is exclusive to Rondevlei, where bussing was provided for organised outings such as the school groups and senior citizen groups. Only three individuals out of 672 interviewed used public transport; two took the train and one person travelled by minibus taxi (the remaining 6 visited Zeekoeivlei by a private minibus taxi). Less than one percent (0.45%) travelled to the green spaces using public transport.

Table 2: Total Park Users by Mode of Transport (n=672)
Source: As gathered in this study

	Car own	Car shared	Motorbike	Bicycle	Bus	Minibus taxi	Train	Walk
Die Oog	10	11		2				18
Edith Stephens	3	3						1
Meadowridge Common	49	16				1	1	48
Rondebosch Common	90	42		10			1	25
Rondevlei	25	41			70			8
Strandfontein	9	6						
Zandvlei	34	18						23
Zeekoeivlei	48	46	3			6		4
TOTAL	268	183	3	12	70	7	2	127

6.2.3 Safety and Security

Safety and security concerns were mentioned among both users and the public regarding the green spaces. While safety concerns only accounted for a small percentage of why visitors did not visit the green spaces (6%), many users did have concerns regarding crime and vagrancy (Table 1). At Die Oog, people were concerned about visiting the location alone because of "strange people hanging around" in the neighbourhood (personal communication, surveyed public, April 2013). A number of people surveyed near Zandvlei Nature Reserve were concerned about gang violence, drugs, theft, rape, and murder; one individual stated that often people don't want to even leave their homes for fear of crime. A concern over people engaging in illegal activity in or around the green spaces was noted by several users. Walking to certain locations such as Zandvlei or Zeekoeivlei was regarded as "unsafe," particularly alone, which limits accessibility to the spaces. Users were restricted in their access of green spaces by perceptions of safety in the green space and surrounding vicinity.

6.2.4 Effects of Spatial Development

Analysing the cross reserve data revealed interesting trends at each of the green spaces in relation to ethnicity and location. In Die Oog, a majority of green space users were white (78%) (Fig. 17c), while in Edith Stephens, the majority of users were coloured South Africans (86%) (Fig. 18c). In Meadowridge Common, 85% of users were white South Africans (Fig. 19c). Rondebosch Common users were slightly more diverse; about half were white South Africans, while coloured South Africans comprised 38% of the total users (Fig. 20c). In Rondevlei, the majority of users were coloured South Africans (62%), with white South Africans making up 28% (Fig.

21c). In Strandfontein, the majority of visitors were white South Africans (67%), with 27% of users falling under the grouping 'other' (Fig. 22c). White South Africans made up the majority of users (75%) in Zandvlei (Fig. 23c), while coloured South Africans accounted for the majority (69%) in Zeekoeivlei (Fig. 24c).

Overall, half of the green space users (50%) were white South Africans, while coloured South Africans totalled 39% (Table 3). There was significantly less representation from the black South African community (7%) or Asian South Africans (2%); the remainder (4%) were classified as 'other' which was generally tourists from Europe or the United States. The trends on ethnic breakdown of green space users vary by neighbourhood and green space; an analysis of the Cape Town Census in the Discussion chapter (chapter 7) reveals how the City's ethnic breakdowns by suburb relate to the ethnic make-up of the surveyed green space users in this study.

Table 3: Total Park Users by Ethnicity (n=672)
Source: As gathered in this study

	White (SA)	Black (SA)	Coloured (SA)	Asian (SA)	Other
Die Oog	32	4	1	1	3
Edith Stephens		1	6		
Meadowridge Common	98	8	9		
Rondebosch Common	82	14	64	7	1
Rondevlei	40	6	89		9
Strandfontein	10		1		4
Zandvlei	56		15	1	3
Zeekoeivlei	15	11	74	3	4
TOTAL	333	44	259	12	24

6.2.5 Park Interest

Each of the eight green spaces provides differing facilities which may attract a variety of green space users. Different patterns emerge when looking at individual reserve data and cross reserve data for city-wide trends. In Die Oog, over one third of the visitors were under the age of 15 while only 3 visitors were over the age of 70 (7%) (Fig. 17a). Similarly, in Edith Stephens, the majority of green space users were students under the age of 15 (43%) (Fig. 18a, Fig. 18d). In Meadowridge Common, Rondebosch Common, Zandvlei, and Zeekoeivlei, there was a fairly even spread of users across the age groups, with the exception of very few young adults (aged 16 to 19), and elderly users over the age of 80 (Fig. 19a, Fig. 20a, Fig. 23a, Fig. 24a). In Rondevlei, nearly half of users were under the age of 15 (47%), while those 60 and over accounted for 18% (Fig. 21a). At Strandfontein, the age breakdown was decidedly older with two-thirds of users between the ages of 50 and 69, while 13% were 80 or older (Fig. 22a).

Overall, the age breakdown was fairly evenly split, with the exception of teenagers 16 to 19 (3%), and those age 80 and older (2%); this was a trend distinctly exhibited in four of the green spaces (Table 4). Children age 15 and younger had the highest representation, accounting for over one-fifth of users (22%). The total male-female split was less of a contrast, with a 52% male-48% female divide (Table 5). Occupations of green space users

showed a great deal of variety, however, the top two 'occupations' were significant in number (Table 6). Near one quarter of green space users (24%) were students, while retirees made up 15% of the total. City-wide trends reveal that a significant proportion of green space users are children age 15 and under, and students, while young adults aged 16 to 19 and elderly over the age of 80 are underrepresented across this survey.

Table 4: Total Park Users by Age Group (n=672)
Source: As gathered in this study

	< 15	16 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	Older
Die Oog	15	5	5	5	2	1	5	2	1
Edith Stephens	3		1	1	2				
Meadowridge Common	19	3	12	14	17	13	19	16	2
Rondebosch Common	25	1	33	30	45	18	12	4	
Rondevlei	67	6	18	6	15	5	9	12	6
Strandfontein	1			1	1	5	5		2
Zandvlei	6	2	5	5	12	17	18	9	1
Zeekoeivlei	11	2	19	20	21	21	12	1	
TOTAL	147	19	93	82	115	80	80	44	12

Table 5: Total Park Users by Gender (n=672)
Source: As gathered in this study

Green Space	Female	Male
Die Oog	22	19
Edith Stephens	4	3
Meadowridge Common	57	58
Rondebosch Common	79	89
Rondevlei	82	62
Strandfontein	4	11
Zandvlei	40	35
Zeekoeivlei	36	71
TOTAL	324	348

Table 6: Total Park Users by Occupation (n=672)
Source: As gathered in this study

Top 10 Occupations	Percentages
Student	24%
Retired	15%
Sales and Related	5%
Education/Training/Library	5%
Self-Employed	5%
Arts/Design/Entertainment/Sports/Media	4%
Personal Care/Services	4%
Unemployed	4%
Business/Finance Operations	3%
Homemaker	3%

Personal interests and hobbies also affect how people interact with green spaces. Users visited the eight green spaces for a variety of reasons. While some uses were specific to certain green spaces, such as birding at Strandfontein and educational programmes at Rondevlei, most were applicable to all of the green spaces, or could be grouped together by category. As users were able to give multiple reasons as to why they were visiting the site, total number of responses is 879 (users surveyed= 672) (Table 7). Topping the list is exercise, with nearly one quarter of users, closely followed by dog walking (19%). Other popular responses included fresh air (10%) and nature appreciation (10%).

For the public, there were a number of reasons why people did not frequent the green spaces included in the study. Often, it was simply a matter of interest; 16% stated the green space did not suit their interests, while 12% favoured going to larger green spaces or beaches (Table 1).

Table 7: Total Park Users by Reasons for Visiting Park (n=879)
Source: As gathered in this study

Top 10 Reasons for Visiting Park	Percentages
Exercise	23%
Dogwalking	19%
Fresh air	10%
Nature appreciation	10%
Relax	8%
Food- Braai/Picnicking/Tea Room	7%
Outing with children	6%
Curiosity	6%
Education	6%
Beautiful location	4%

6.2.6 Information Barriers

The eight green spaces in this study were visited in varying degrees, with as many as 168 people surveyed in Rondebosch Common, and as few as seven at Edith Stephens. The most glaring observation at Edith Stephens was the lack of visitors to the green space, at any given time. That only seven users were recorded over a total of 15 hours is an indication of a poorly utilised space; Edith Stephens is not used to its full potential or at full capacity. Public data gathered outside of Edith Stephens revealed that, despite conducting surveys directly outside the entrance on Lansdowne Road, only one person out of 62 had ever visited the park and over half (54%) lacked information about the green space and its offerings. Similarly in Die Oog, one third of those surveyed had never heard of Die Oog and did not know where it is located. Overall, one-fifth (20%) of the public surveyed were unaware of the green space, with an additional 7% being unaware of what the space offers (i.e. facilities, programmes, etc.) (Table 1).

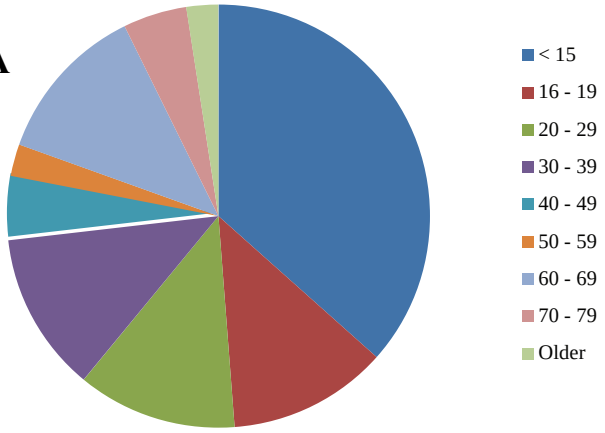
6.3 Individual Reserves

6.3.1 Die Oog Conservation Area

Forty one users were surveyed at Die Oog over the five 3 hour visits. While visitors ranged from a variety of ages, over one third of the visitors were under the age of 15 while only 3 visitors were over the age of 70 (7%) (Fig. 17a). A majority of green space users were white (78%) (Fig. 17c) and students[2] (42%) (Fig. 17d). The majority of users came from the surrounding neighbourhoods; 63% of users reside in Bergvliet or Meadowridge, and 19% live in another nearby suburb (Fig. 17e).

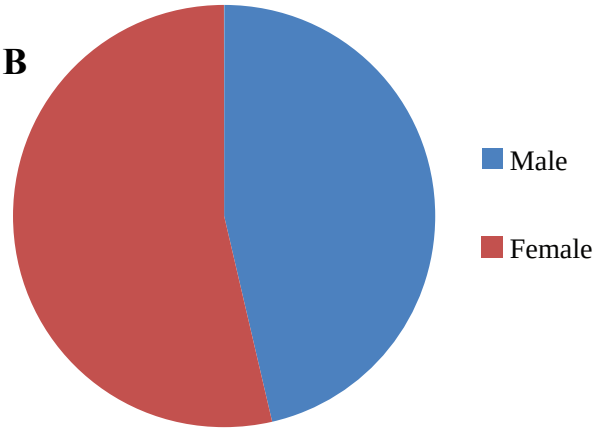
[2] 'Students' as an occupational category refers to all students, including those in primary, secondary, and tertiary education. When cross-referencing the data with the age of the park user, an analysis of the level of education was conducted.

A



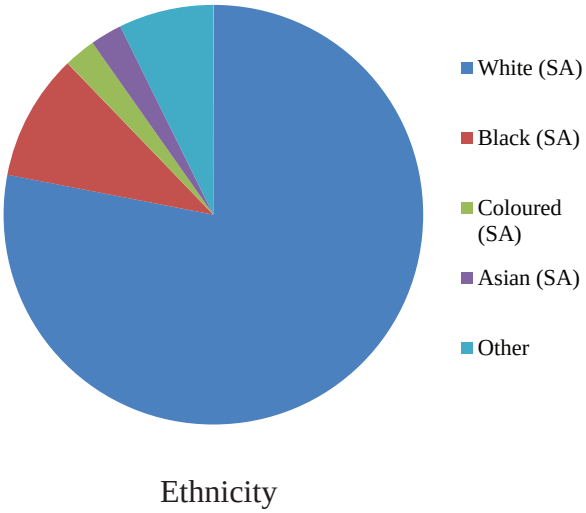
Age Group

B



Gender

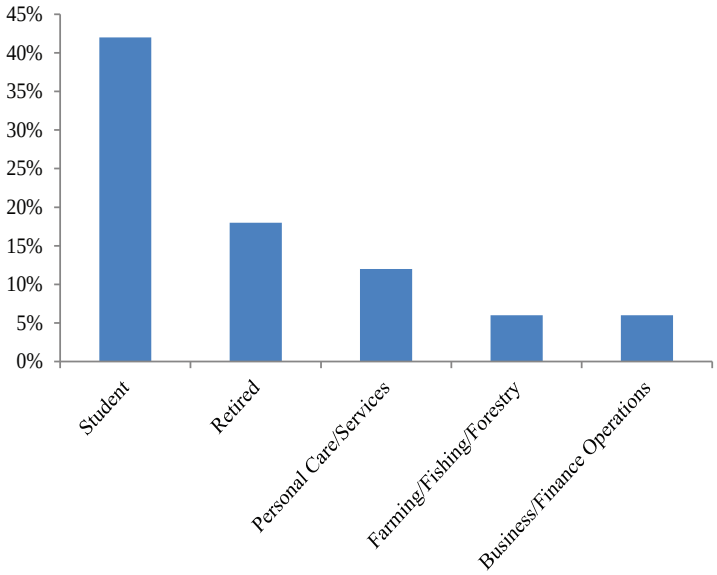
C



Ethnicity

D

Top 5 Occupations



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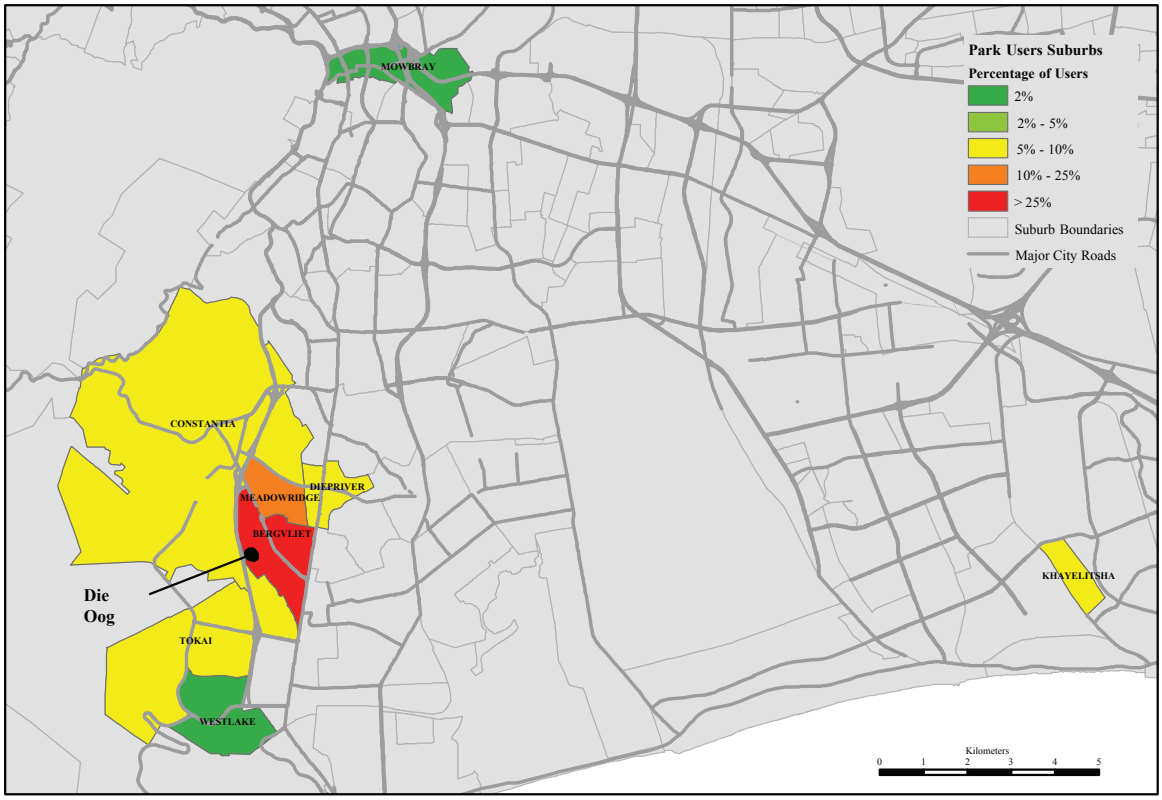

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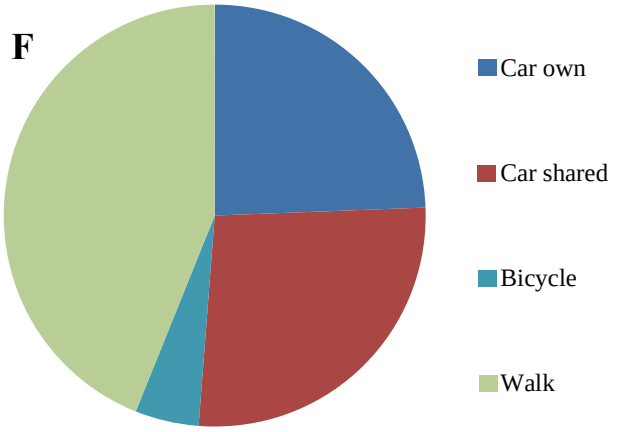
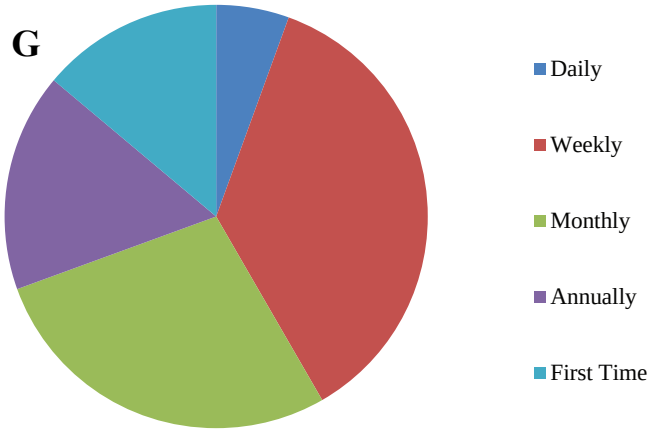


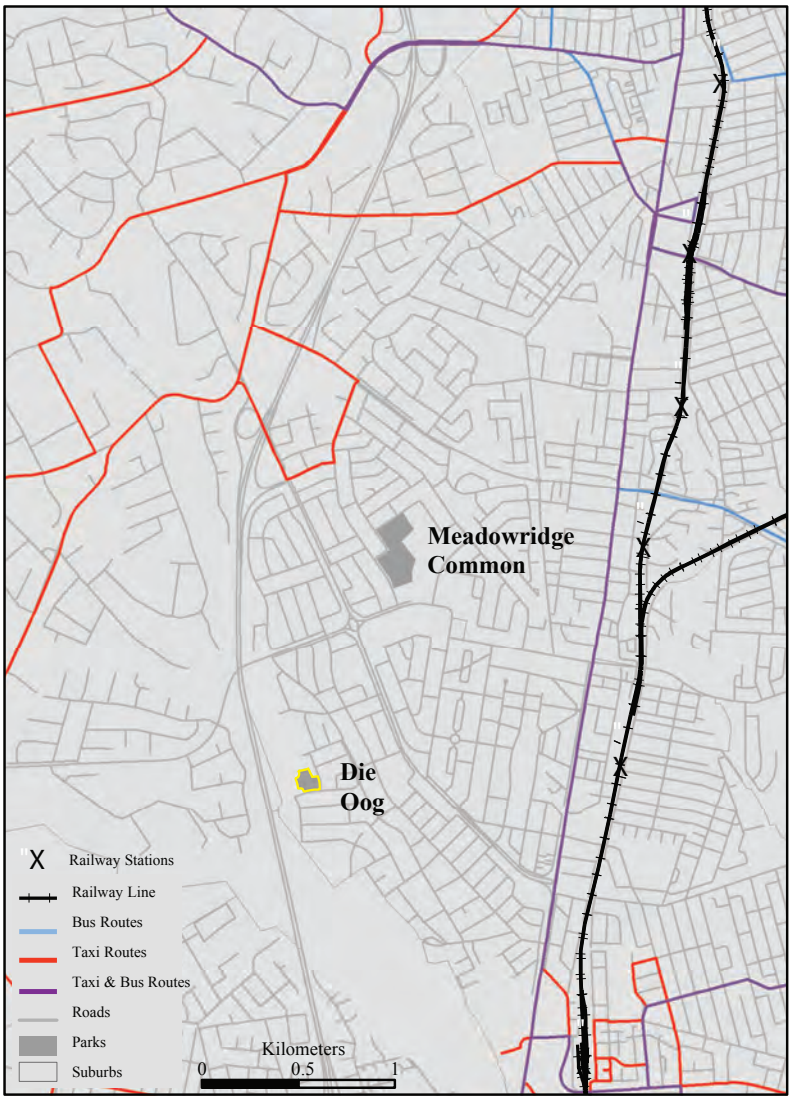
Mode of Transport

G



Frequency of Visits

J



H

Reasons for Car Transport Choice	
Poor public transport options	26%
With young children	26%
Work	9%
Convenience	13%
Distance	13%
Lazy	13%

I

Reasons for Visiting Park	
Feed the birds	24%
Relax	18%
Fresh air	16%
Outing with children	15%
Exercise	12%
Curiosity	9%
Beautiful location	4%
For work	1%
Proximity	1%

FIGURE 17: Die Oog Conservation Area Data (n=41)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map

Maps source: City of Cape Town Maps Department, 2009

Figures source: As gathered in study

Green space users generally accessed the location via private car (own or shared) or walking, though a small percentage travelled using a bicycle (5%) (Fig. 17f). The main reasons people chose to travel by car were poor public transport options (26%) or travelling with young children (26%) (Fig. 17h). The public transport map illustrates where the bus and taxi routes are located, as well as the train line, all of which are between two and three kilometres distance from Die Oog (Fig. 17j).

Green space users visited Die Oog for a variety of reasons. Nearly a quarter of visitors came to feed the birds (24%), while others came to relax (18%) and get fresh air (16%) (Fig. 17i). Others also mentioned having an outing with children (15%), exercise (12%), and curiosity (9%) as reasons to visit Die Oog. Frequency of visits was over a broad range with a few respondents coming daily (6%), and the majority visiting weekly (42%) or monthly (32%) (Fig. 17g).

Die Oog appears to largely be used by children, particularly young children under the age of 5, visiting with a parent, caregiver, or grandparent. It is a locally used green space, with the majority of users coming from nearby suburbs and travelling by car or by foot. Most users visit once or twice a month.

6.3.2 Edith Stephens Wetland Park

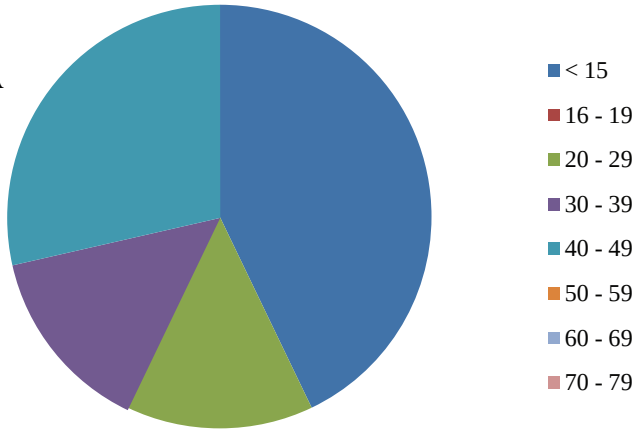
Surveyed users at Edith Stephens totalled seven people over five 3 hour visits. Of these users, the majority were under the age of 15 (43%) (Fig. 18a) and coloured[3] South Africans (86%) (Fig. 18c). Students (43%) accounted for the most common occupation (Fig. 18d). The majority of users came from Mitchell's Plain (57%), with the remainder (one user each) from Athlone, Weltevreden Valley, and Khayelitsha (14% respectively) (Fig. 18e).

In general, users accessed the green space via private car (owned or shared: 86%), although one individual came by foot (Fig. 18f). Those with cars cited having children, distance, and carpooling as the reasons for driving to the green space (Fig. 18h). Public transportation access to Edith Stephens is easiest via minibus taxi or bus, which stops along Lansdowne Road, a few hundred metres from the park entrance (Figure 18j).

The majority of users were visiting Edith Stephens for their first time (57%), though two users frequented the space weekly (29%) (Figure 18g). Reasons for visiting the green space included appreciation of nature (43%), driver for teachers attending the training course (29%), and fishing (29%) (Fig. 18i).

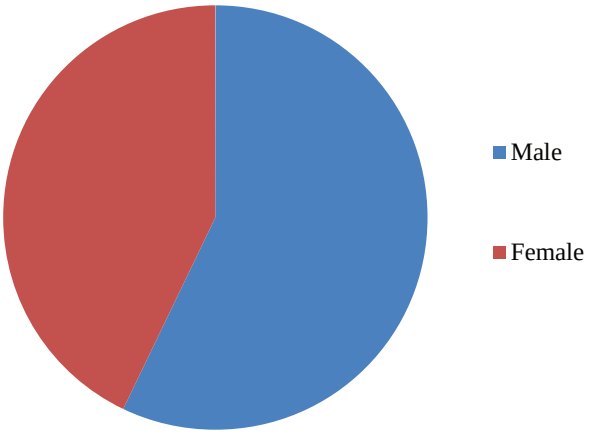
[3] Coloured' refers to people of mixed race in South Africa. While the label 'Coloured' was used as part of a system of oppression during apartheid, it is also a lived identity in South Africa and Cape Town today and it is used here in that manner, but in full recognition of its complex and frequently problematic history (Ernstson, 2012).

A



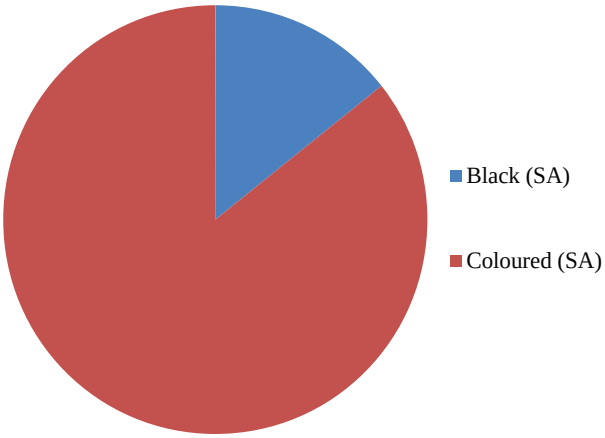
Age Group

B



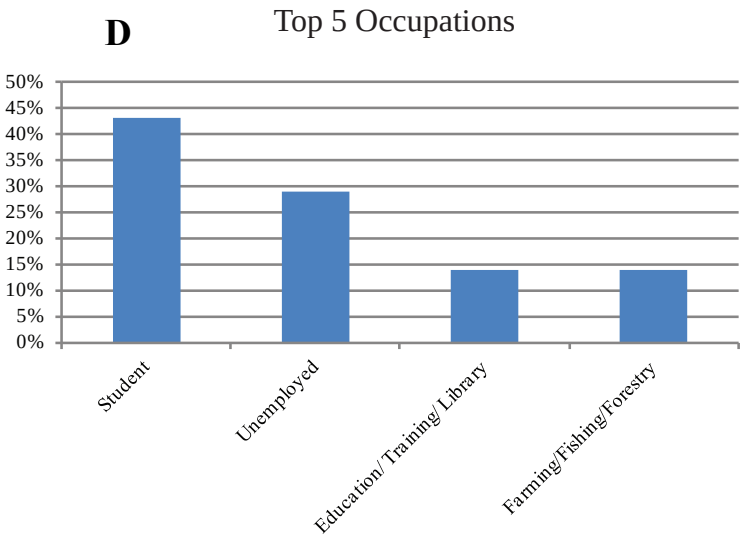
Gender

C



Ethnicity

D



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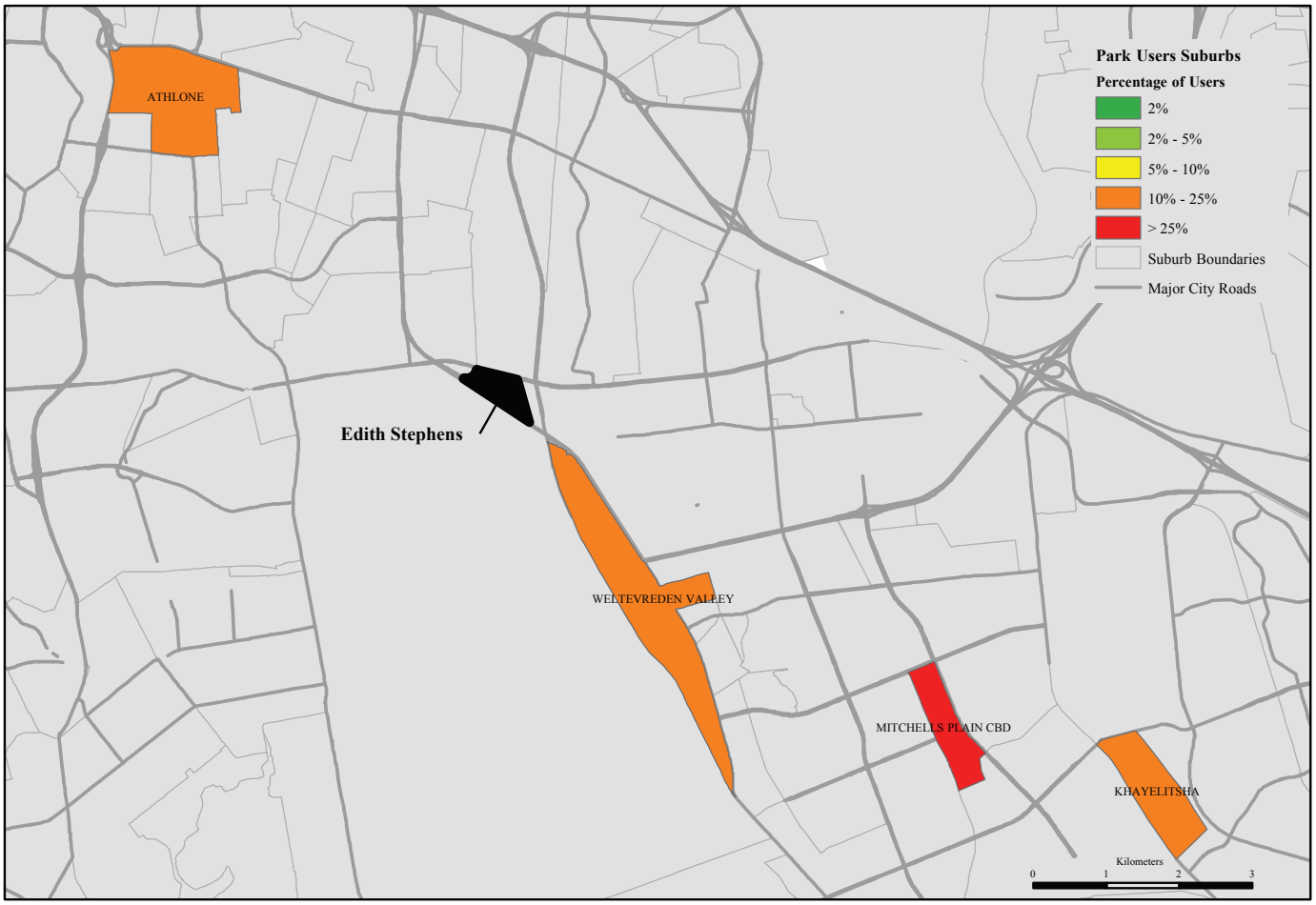

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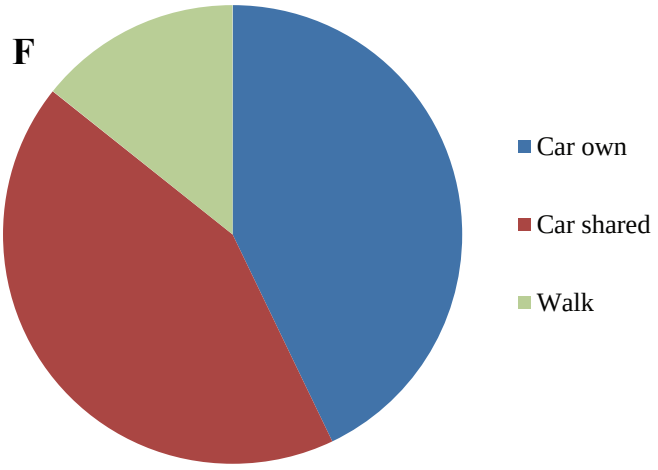
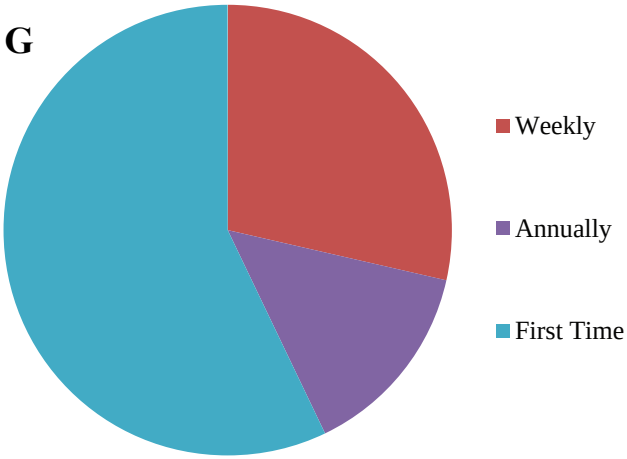


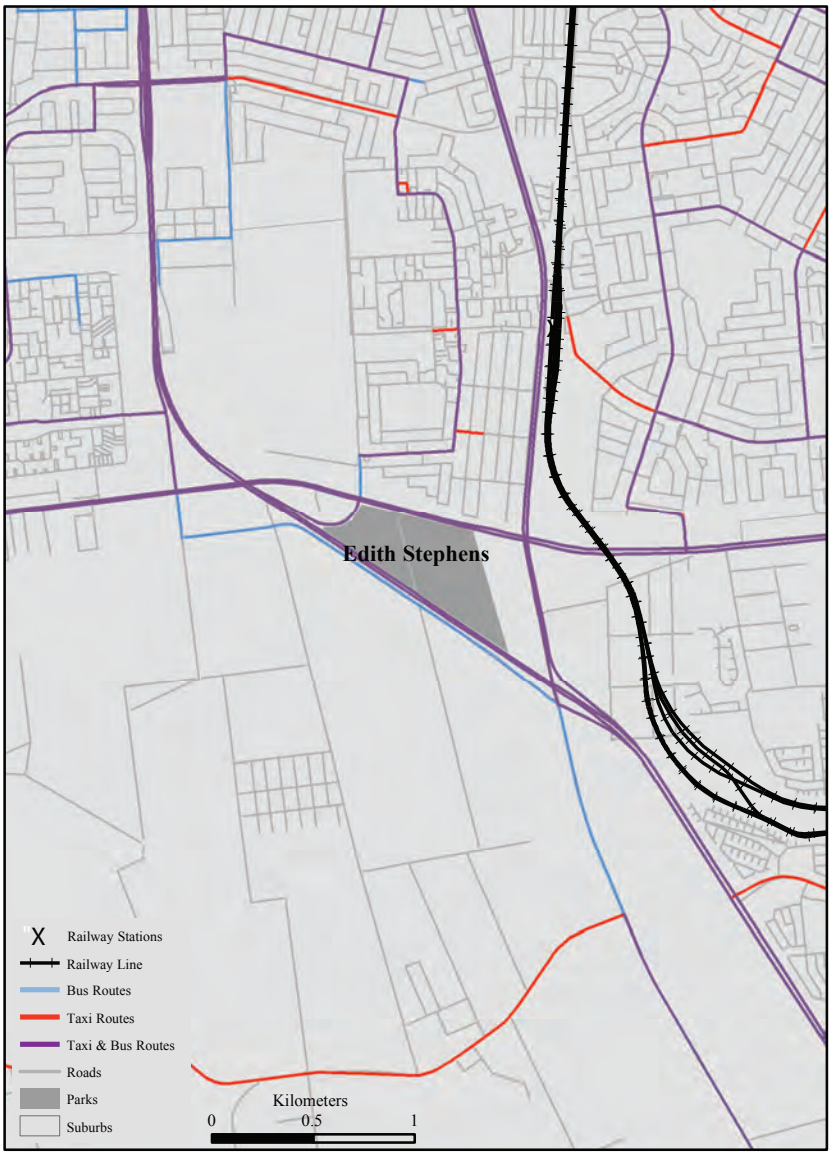
Mode of Transport

G



Frequency of Visits

J



H

Reasons for Car Transport Choice	
With children	33%
Distance	33%
Carpooling	33%

I

Reasons for Visiting Park	
Nature appreciation	43%
Driver	29%
Fishing	29%

FIGURE 18: Edith Stephens Wetland Park Data (n=7)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map around Edith Stephens

Maps source: City of Cape Town Maps Department, 2009

Figures source: As gathered in study

All of the users were surveyed during one visit, when a teacher training course was being held. In order to avoid distorting data, those attending the course were not interviewed, as they were using the conference centre rather than the green space. Those surveyed were either fishermen (separate from the training course), or individuals providing transportation to the teachers and visiting the green space while waiting.

The limited number of users at Edith Stephens is an important finding. The data collected is almost negligible in its analytical use; the main result is that Edith Stephens is underutilised by green space users.

6.3.3 Meadowridge Common

Green space users surveyed at Meadowridge Common totalled 115 people, and were comprised of a variety of age groups. Generally, the spread of age groups was fairly even, with the exception of the age brackets 16 to 19, and over 80, totalling 3% and 2%, respectively (Fig. 19a). The majority of users at Meadowridge Common were white South Africans (85%) (Fig. 19c), and came from Meadowridge (58%) or Bergvliet (14%), with considerably fewer visitors from the surrounding suburbs such as Constantia and Diep River (Fig. 19e). The most common occupations among users were retired (26%) and students (22%) (Fig. 19d).

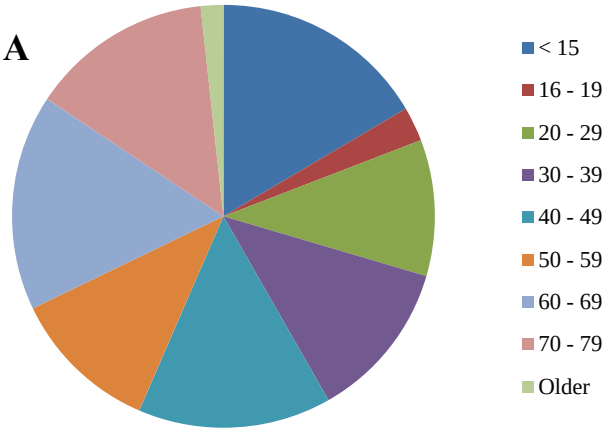
Almost all green space users accessed Meadowridge Common either by car (own or shared: 57%) or by foot (42%) (Fig. 19f). A large portion of users (45%) cited using car transport due to dogs (Fig. 19h). Public transport is similar to that of Die Oog, where minibus taxis and buses can be accessed along the Main Road. The nearest train station is Diep River station, near the Main Road in Diep River (Fig. 19j). While several reasons were listed, nearly half of visitors came to walk their dogs, while others used the space for exercise (19%) (Fig. 3i). Meadowridge Common users showed an overwhelming trend to visit the green space either weekly (69%) or daily (26%) (Fig. 19g).

General trends in Meadowridge show a wide variety of age groups, with the exception of young adults (16 to 19) and elderly (over 80). Most users come from nearby suburbs, which allows for a large numbers of users to walk, though the majority still travel by car. These users also tend to visit Meadowridge frequently, either daily or weekly. The Common is largely a local dog walking space, with occasional users patronising for exercise purposes.

6.3.4 Rondebosch Common

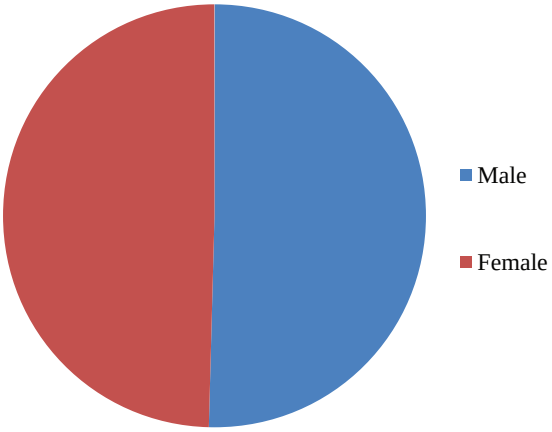
Over the five visits to Rondebosch Common, 168 green space users were surveyed. There was a variety of age groups visiting the Common, with adults aged 20-49 constituting the majority of users (65%). A distinct lack of young adults (16 to 19) and elderly users was observed, with both groups making up 3% of total users (Fig. 20a). About half the users at Rondebosch were white South Africans, while coloured South Africans comprised

A



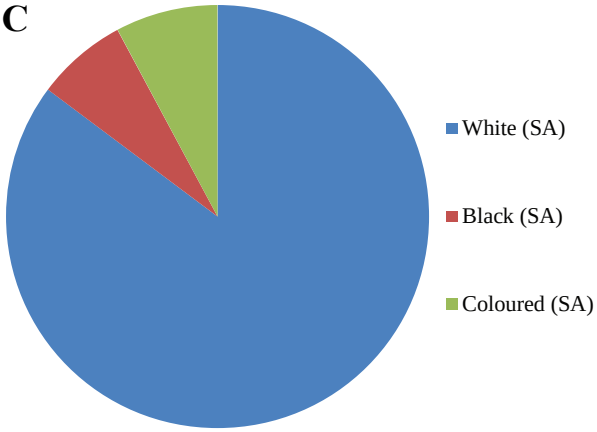
Age Group

B



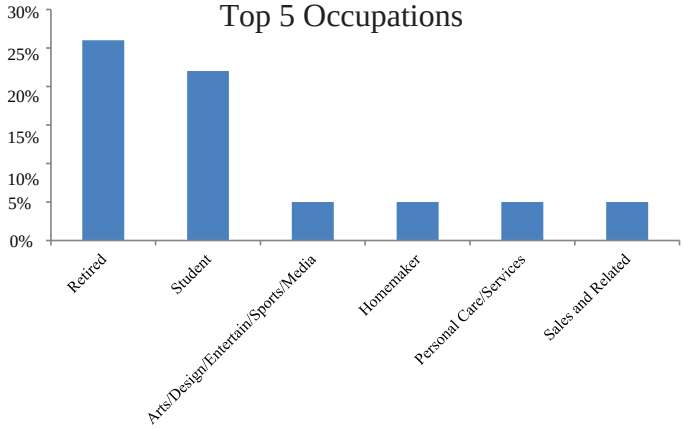
Gender

C



Ethnicity

D



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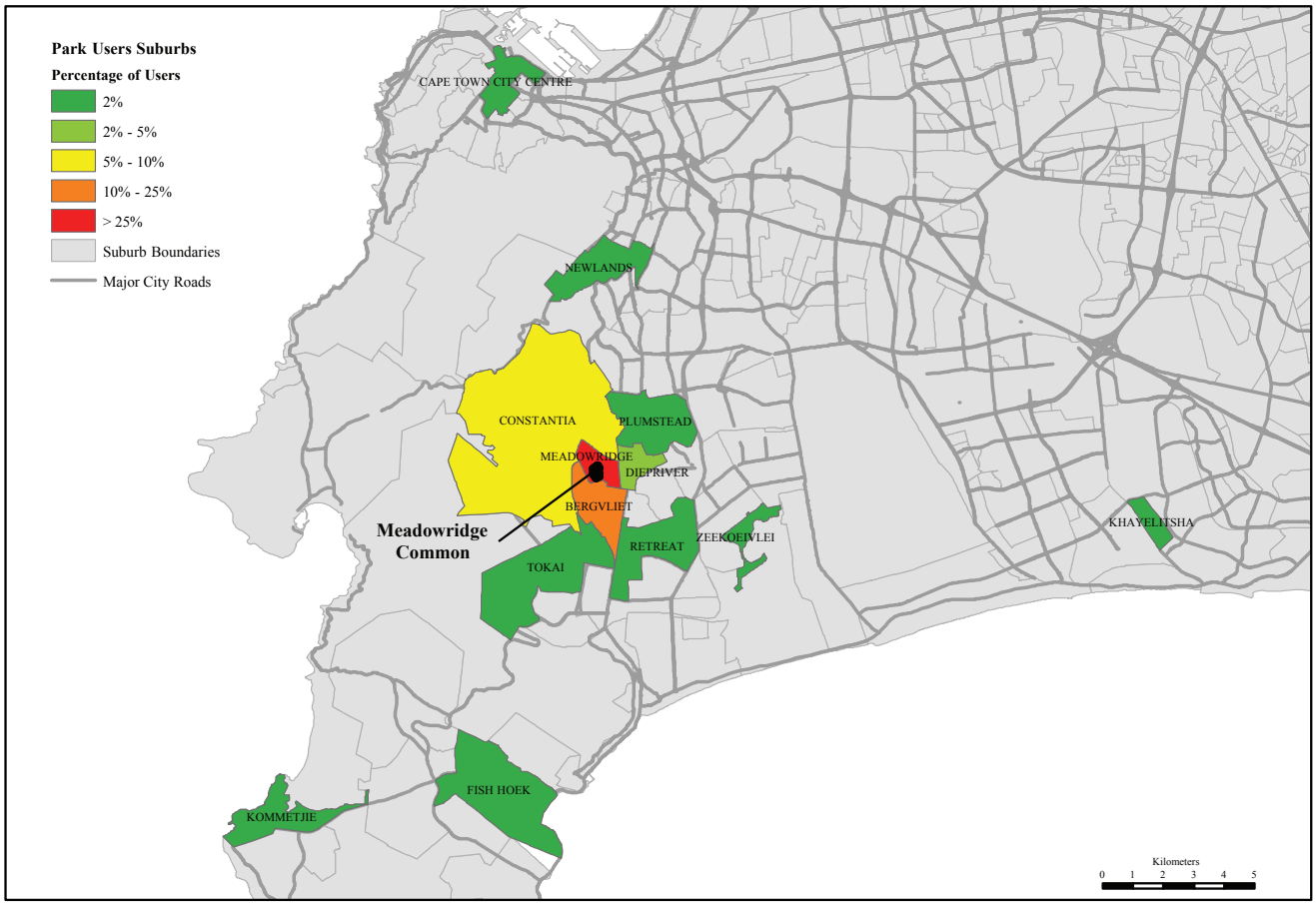

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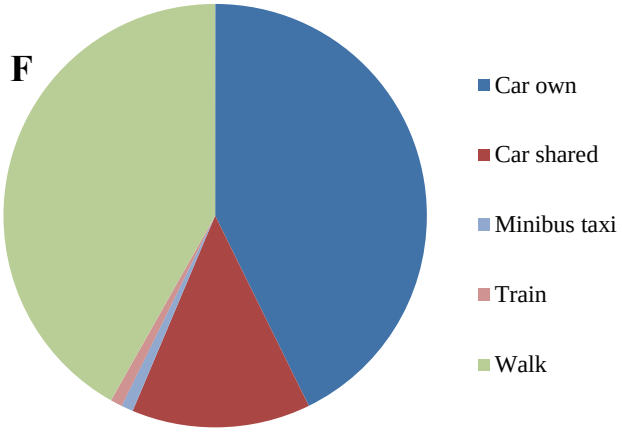
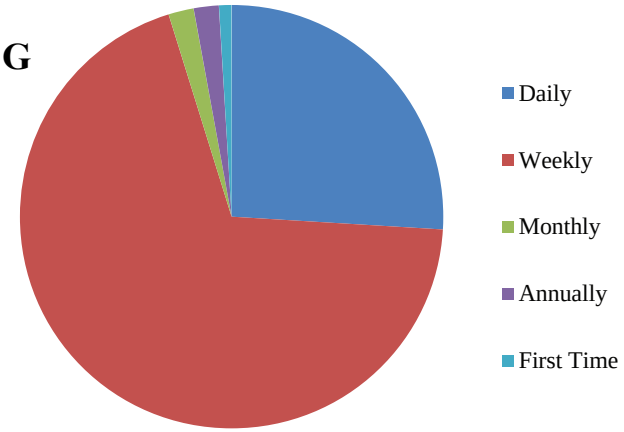


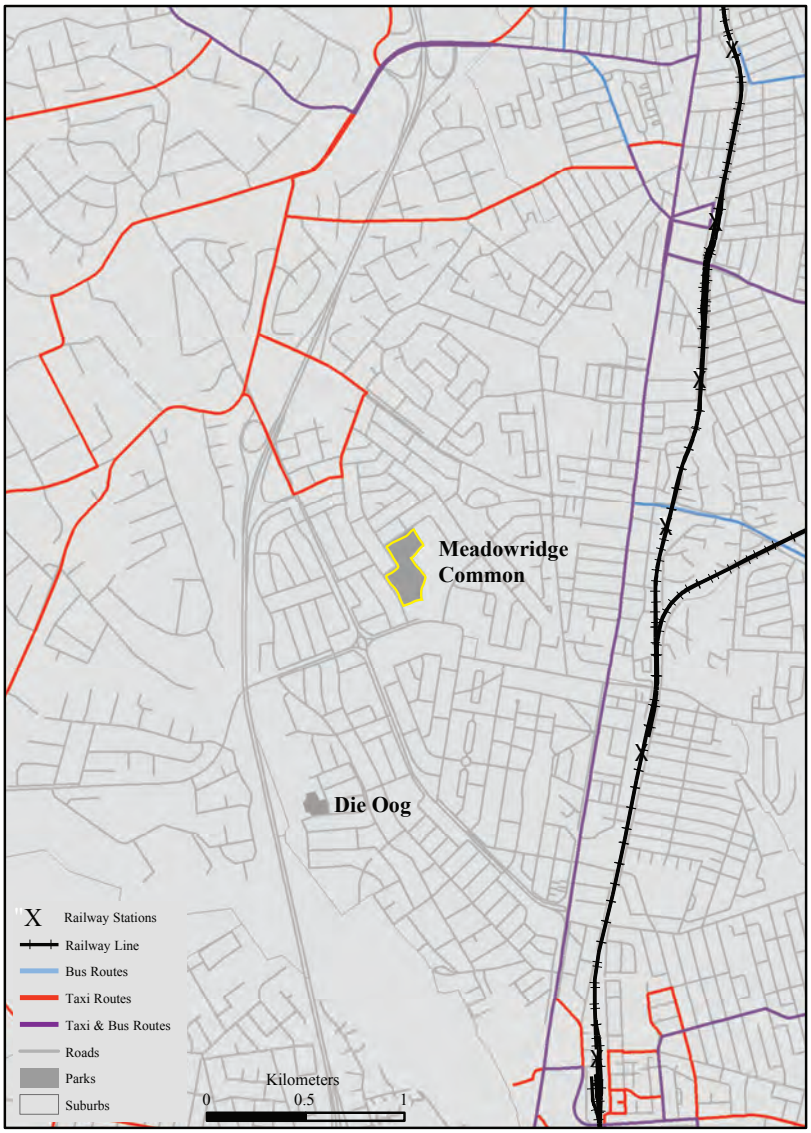
Mode of Transport

G



Frequency of Visits

J



H

Reasons for Car Transport Choice	
Dogs	45%
Distance	26%
With children and dogs	16%
Convenience	5%
Time	5%
Age	3%

I

Reasons for Visiting Park	
Dogwalking	48%
Exercise	19%
Passing through the park	8%
Fresh air	7%
Sport	7%
Outing with children	4%
Lunch	3%
Relax	2%
Work	1%
Nature appreciation	1%

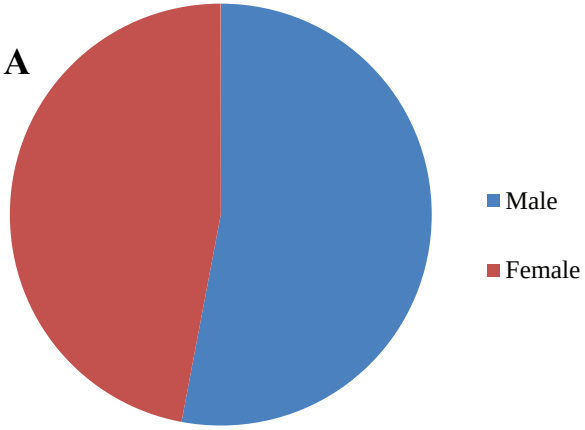
FIGURE 19: Meadowridge Common Data (n=115)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map

Maps source: City of Cape Town Maps Department, 2009

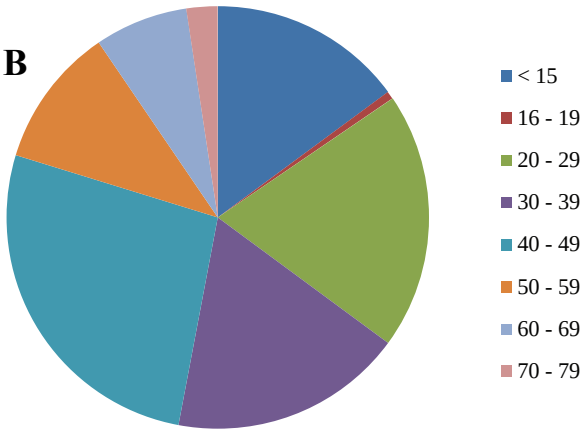
Figures source: As gathered in study

A



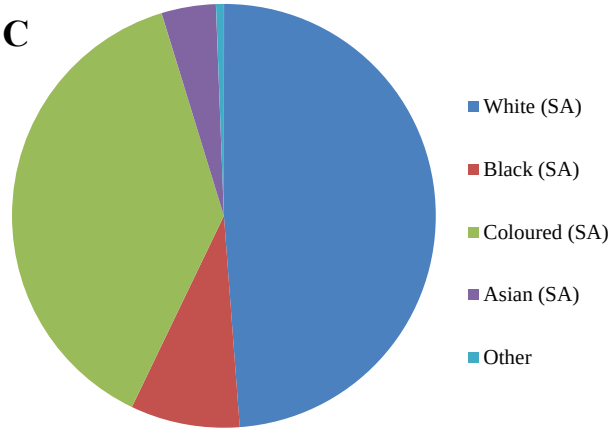
Age Group

B



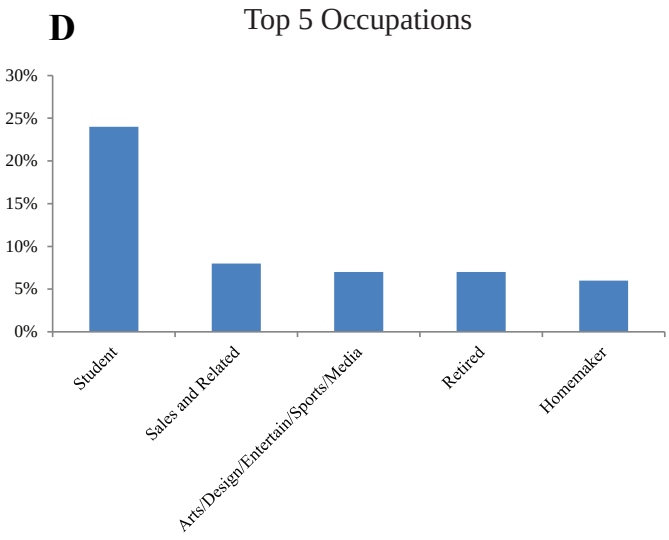
Gender

C



Ethnicity

D



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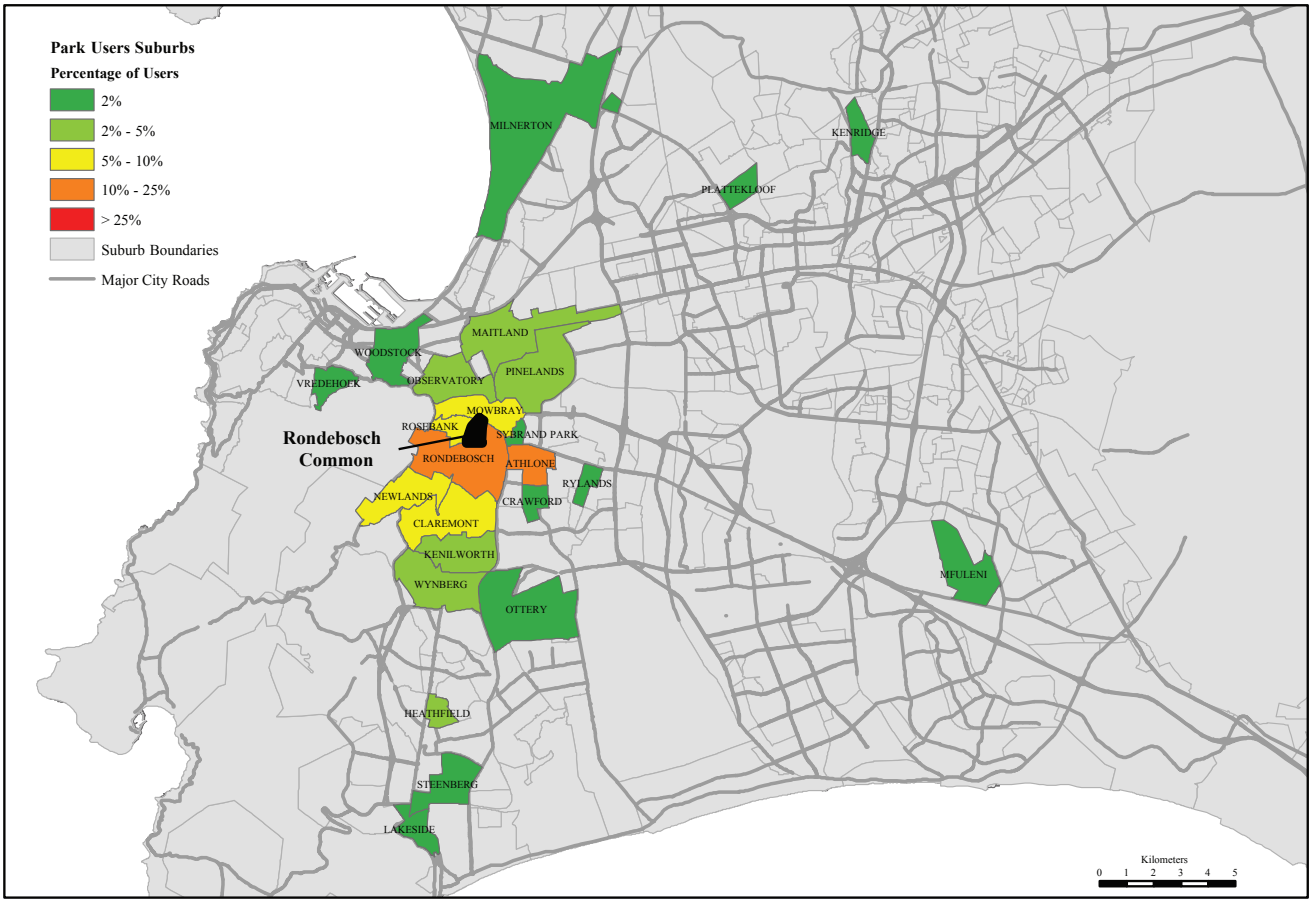

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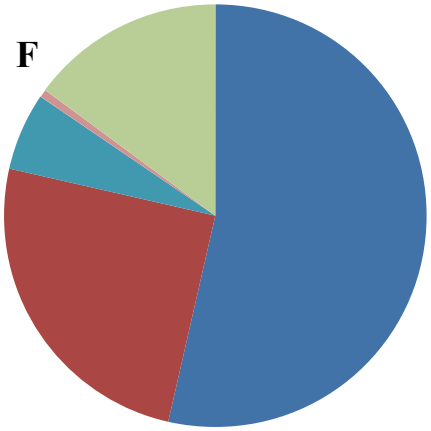
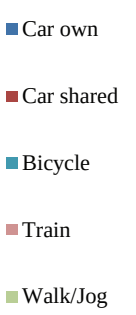
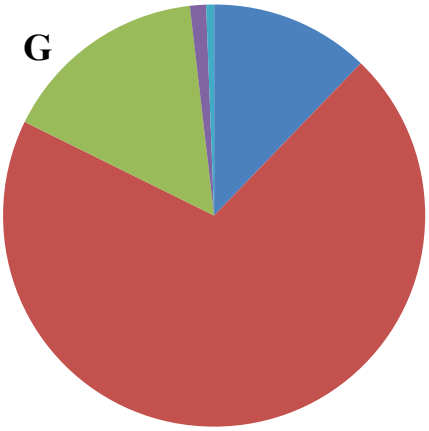
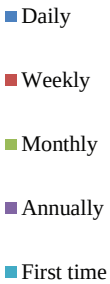




Mode of Transport

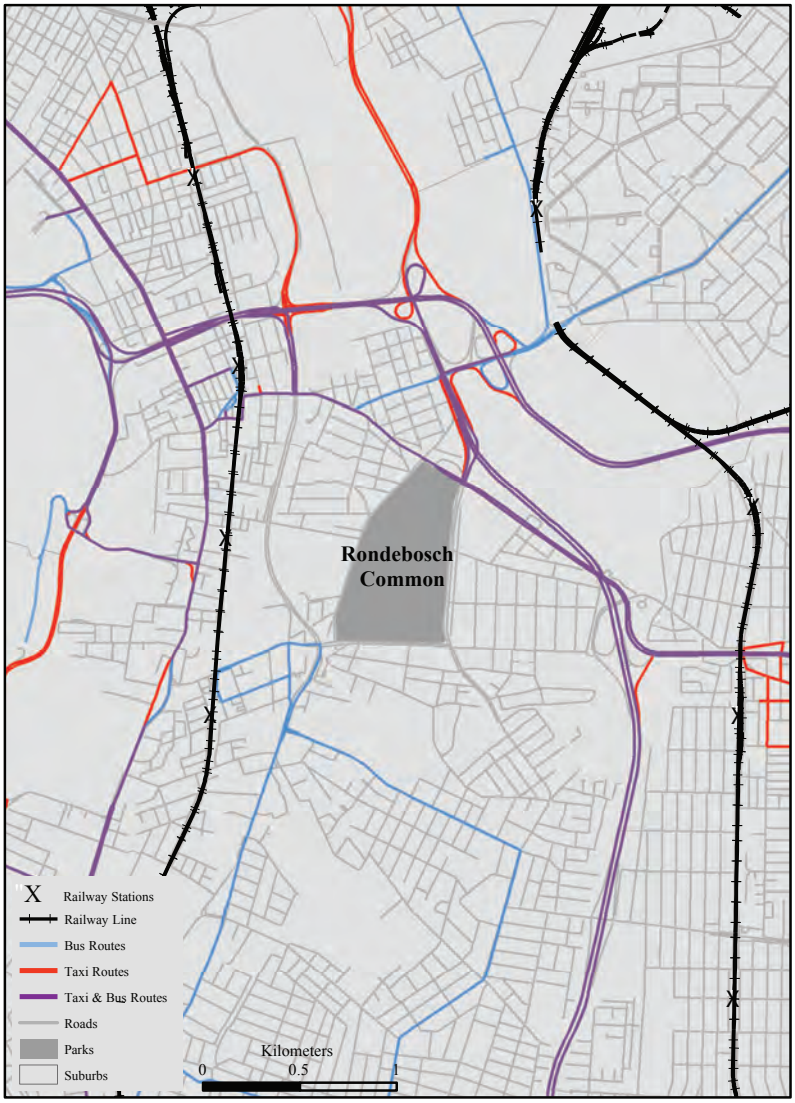
G





Frequency of Visits

J



H

Reasons for Car Transport Choice	
Distance	37%
Convenience	32%
Dogs	16%
With young children	5%
Safety concerns	3%
On route	2%
Own car	2%
Time	2%
Lazy	1%
Work	1%

I

Reasons for Visiting Park	
Exercise	45%
Dogwalking	19%
Fresh air	7%
Outing with children	7%
Relax	7%
Beautiful location	4%
Nature appreciation	3%
Recreation	2%
Proximity	2%
Lunch	2%
Work	1%

FIGURE 20: Rondebosch Common Data (n=168)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map

Maps source: City of Cape Town Maps Department, 2009

Figures source: As gathered in study

38% of the total users (Fig. 20c). Students made up nearly a quarter of users at the Common (Fig. 20d). Green space users were generally from the Southern suburbs, in suburbs near to Rondebosch Common; a quarter of green space users came from within Rondebosch while 14% were from Athlone, an adjacent suburb (Fig. 20e). A number of residents also came from Rosebank, Mowbray, Newlands, and Claremont, which are suburbs surrounding Rondebosch.

Users generally travelled to Rondebosch by car (owned or shared: 79%) (Fig. 20f). People named various reasons for taking cars but the most prevalent were distance, convenience, and dogs (Fig. 20h). Public transport can be accessed via minibus taxis and buses along Klipfontein Road, which borders Rondebosch along its northern end, as well as Main Road in Rondebosch (Fig. 20j). The nearest train station is Rondebosch train station, less than one kilometre away.

People visit Rondebosch Common for various reasons, with exercise (45%) and dog walking (19%) as the top two main reasons (Fig 20i). Other motives for visiting the Common include to enjoy fresh air (7%), take children on an outing (7%), and for relaxation (7%). The majority of users visit weekly (70%), with 12% stating they come daily (Fig. 20g).

Of note in Rondebosch Common is the high traffic flow of users. Green space users were common throughout the day, on varying days of the week, with a higher peak in the early morning hours (7 to 9 am) and evening hours (5pm to 7pm). The majority of users access the green space by car, and generally exercise by walking or jogging around the newly upgraded path that borders the Common. Dog walkers are more commonly seen within the grounds, on the dirt foot paths. The park services a variety of users of all ages and ethnicities, though there is a gap in the young adult age group (16 to 19), as well as those over 70 years of age.

6.3.5 Rondevlei Nature Reserve

A total of 144 people were interviewed at Rondevlei. Nearly half of users were under the age of 15 (47%), while those 60 and over accounted for 18% (Fig. 21a). The females outweighed males in the gender demographic, with 57% to 43% (Fig. 21b). The majority of users were coloured South Africans (62%), with white South Africans making up 28% (Fig. 21c). Rondevlei also attracts users travelling from distances, such as the United Kingdom and America, which account for 6% of the visitors. Users predominantly came from suburbs surrounding the nature reserve, such as Retreat (28%), Grassy Park (22%) and Zeekoeivlei (10%) (Fig. 21e). The most common occupation at Rondevlei was students (51%) (Fig. 21d).

Nearly half of green space users travelled by bus, due to various group outings, such as school and elderly group visits (Fig. 21f). Most of the remainder arrived by car, and chose to for convenience (67%) and due to poor

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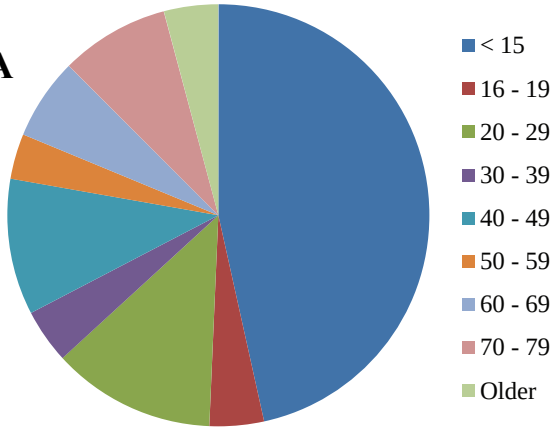
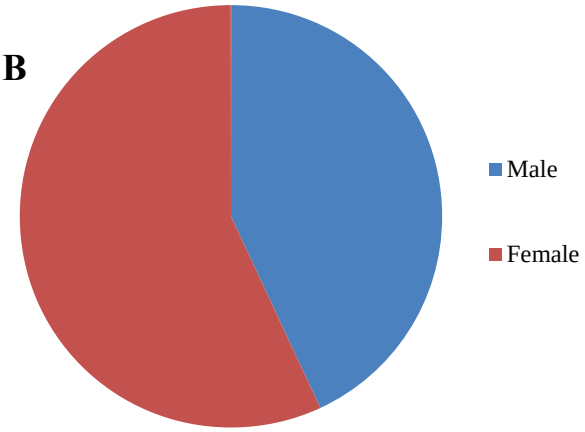


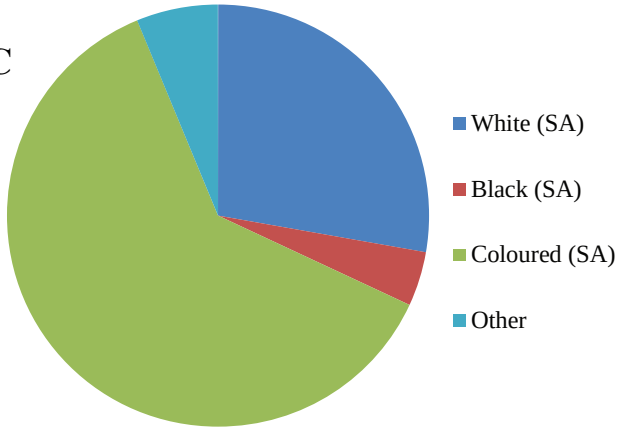
Age Group

B



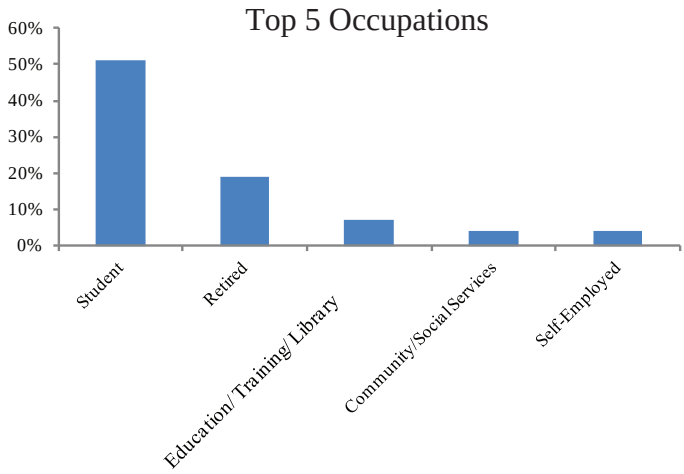
Gender

C



Ethnicity

D



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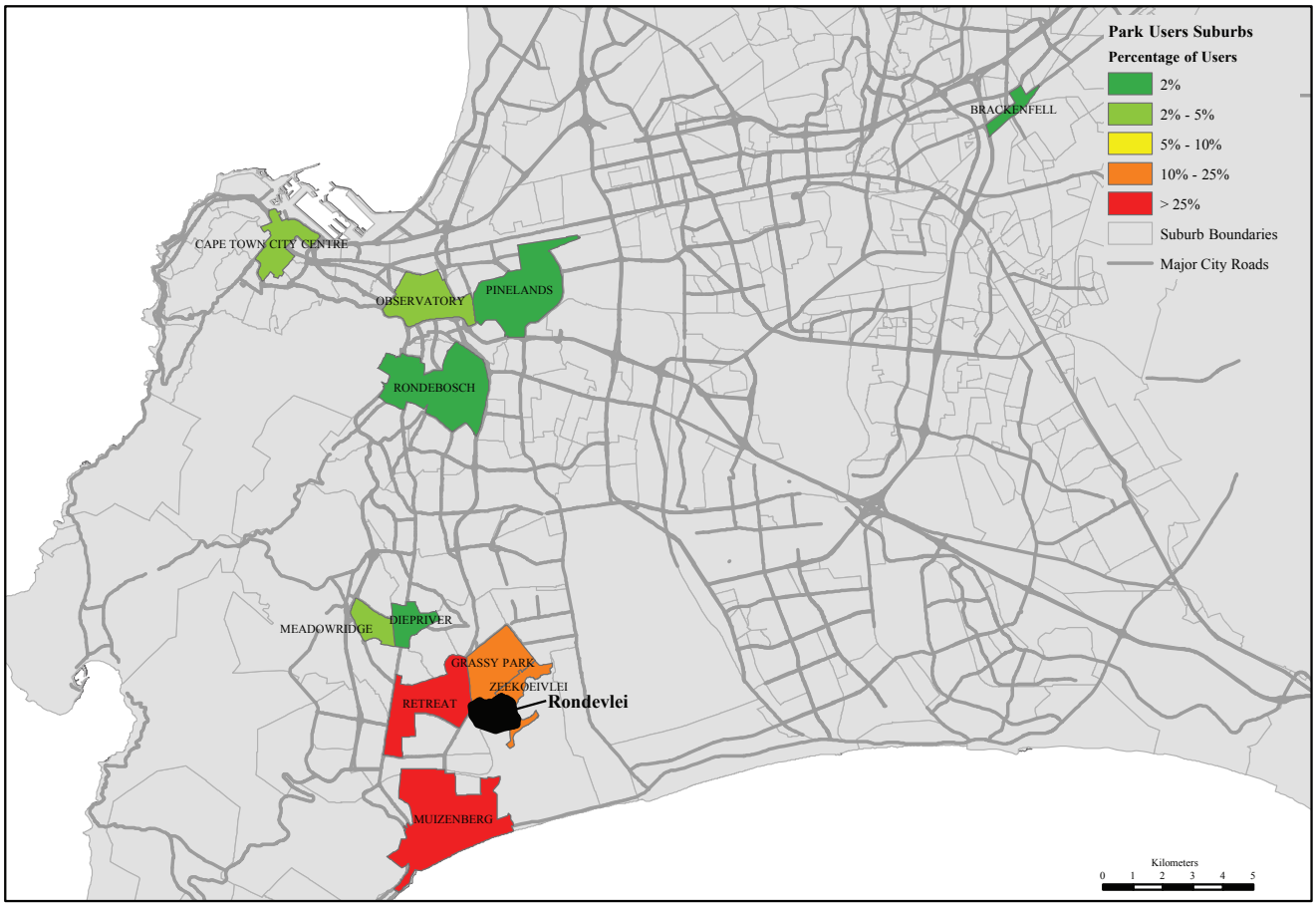

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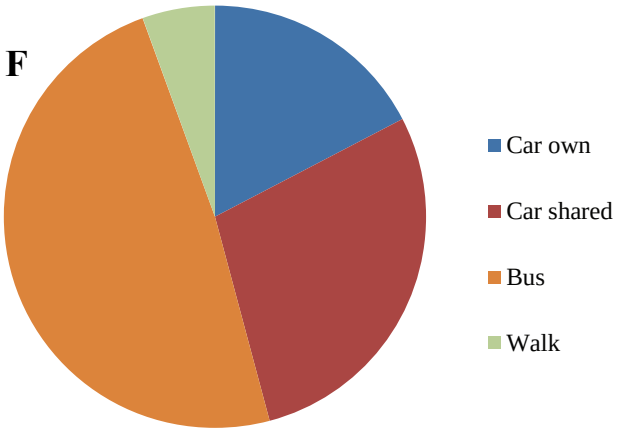
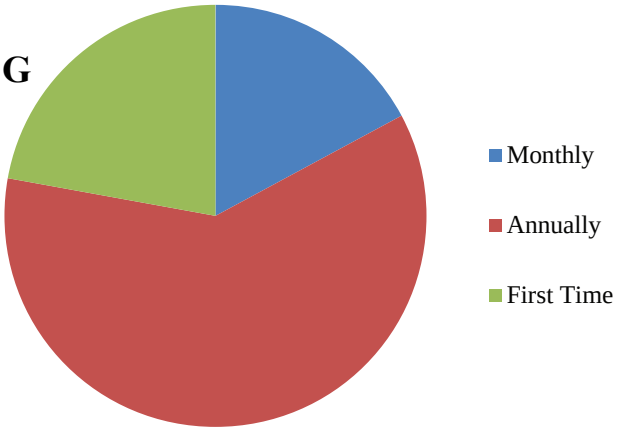


Mode of Transport

G



Frequency of Visits

J

H

Reasons for Car Transport Choice	
Convenience	67%
Poor public transport	17%
Weather	5%
Lazy	5%
Distance	5%
Own a car	1%

I

Reasons for Visiting Park	
Nature appreciation	25%
Educational program	20%
Fresh air	12%
Curiosity	9%
Exercise	8%
Tea room	8%
Outing with children	7%
Organized outing	5%
Photography	3%
Holiday	3%

FIGURE 21: Rondevlei Nature Reserve Data (n=144)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map around Edith Stephens

Maps source: City of Cape Town Maps Department, 2009

Figures source: As gathered in study

public transport alternatives (17%) (Fig. 21h). Public transport to Rondevlei can be accessed via minibus taxi or bus routes on Prince George Drive as well as Fifth Ave, in Grassy Park (Fig. 21j).

About one quarter of users visited Rondevlei for nature appreciation, with another 12% accessing the nature reserve for fresh air (Fig. 21i). Organised outings accounted for about one third of visitors, of which nearly two thirds were education programmes. Visitors generally came to the nature reserve on an annual basis (61%), while nearly a quarter of visitors (22%) were visiting for the first time (Fig. 21g).

General trends in Rondevlei reveal that many users visited as part of organised outings, with school groups, camps, tourist groups and senior citizens. They often travelled using buses, annually or for the first time. Over half of those surveyed were students, and most were under the age of 15. Visitors were more likely to site appreciation of nature or fresh air as reasons to visit the nature reserve than other green spaces in this study.

6.3.6 Strandfontein Birding Area

Strandfontein Birding Area attracted 15 users over the five day survey period. Two-thirds of those users were between the ages of 50 and 69, while 13% were 80 or older (Fig. 22a). There were substantially more men than women in the birding area; the gender breakdown was 73% to 27% (Fig. 22b). The majority of visitors were white South Africans (67%), with 27% of users falling under the grouping 'other' (Fig. 22c). Strandfontein attracted a number of visitors from outside of the Cape Town area, such as Scotland, England, and Hermanus, South Africa. The majority of other users (40%) came from the Southern Suburbs such as Plumstead, Pinelands, Meadowridge, and Constantia (Fig. 22e). The top occupation at Strandfontein were retirees (20%) (Fig. 22d).

Unlike the other green spaces, all of the visitors at Strandfontein arrived by car (owned or shared) (Fig. 22f). The majority of users chose to travel by car because of distance (53%), while over a quarter mentioned that there was 'no other way' (Fig. 22h). Public transport to the birding area is difficult, as the entrance is along a dirt road, approximately 3.5 kilometres from Strandfontein Road where both minibus taxis and buses stop (Fig. 22j).

Reasons for visiting Strandfontein included both birding (75%) and photography (20%) (Fig. 22i). Many of the visitors come to Strandfontein on an annual (40%) or monthly basis (20%) (Fig. 22g).

Strandfontein differs from the rest of the green spaces in the survey in that it attracts a very specific type of user, which is one interested in birding. The majority of users were older, white South Africans, who visited on a monthly or annual basis. The area also attracted a fair percentage of tourists from the United Kingdom, as well as visitors from outside of Cape Town.

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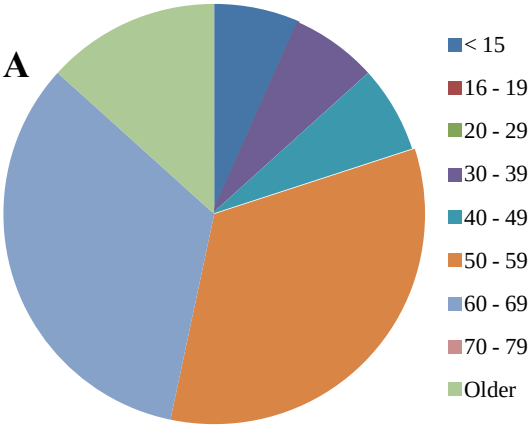
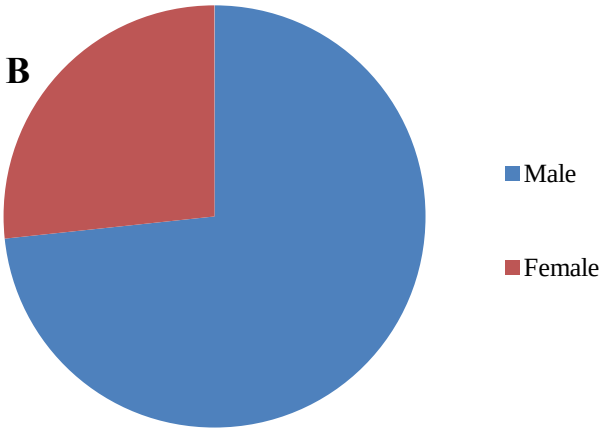


Age Group

B



Gender

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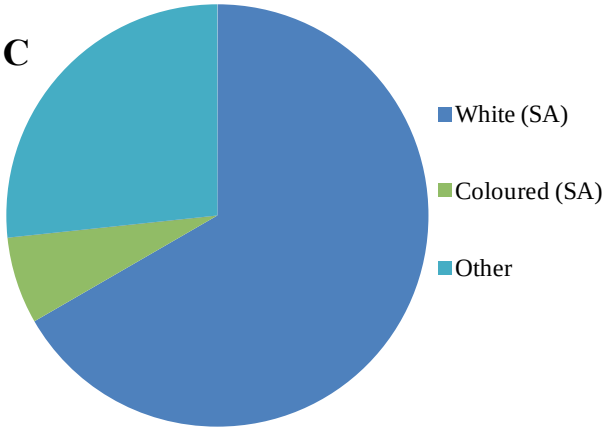
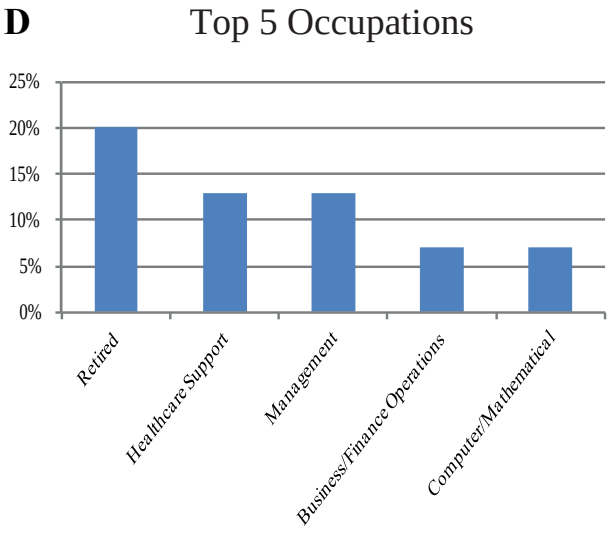


Ethnicity

D



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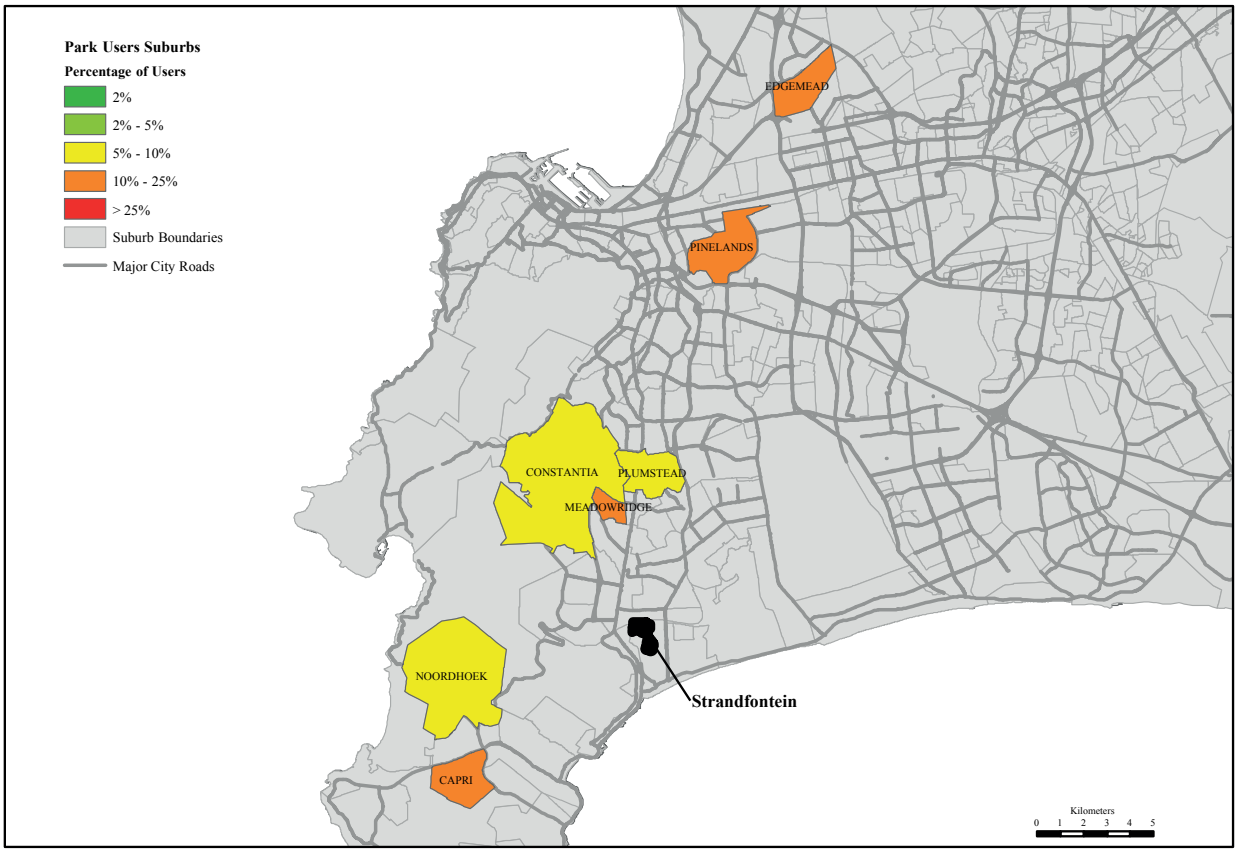

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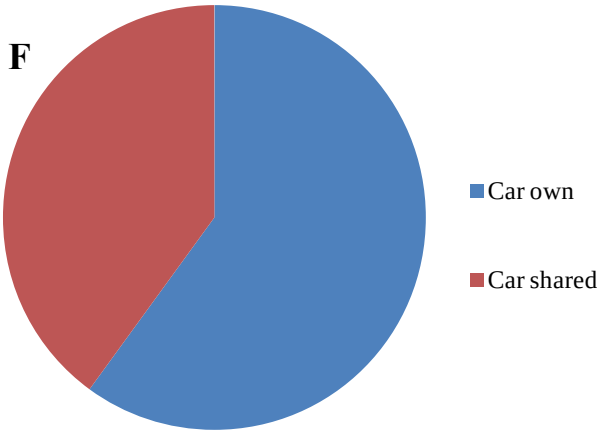
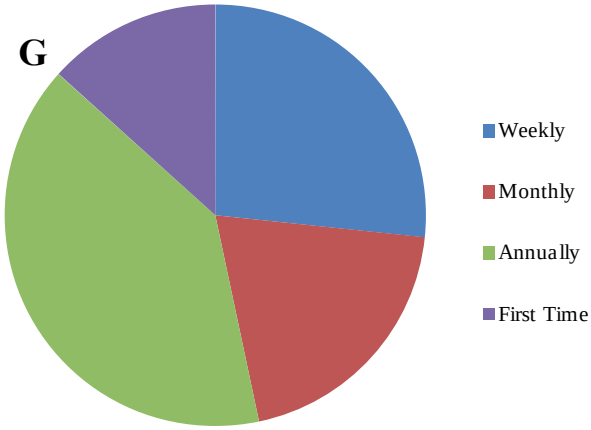


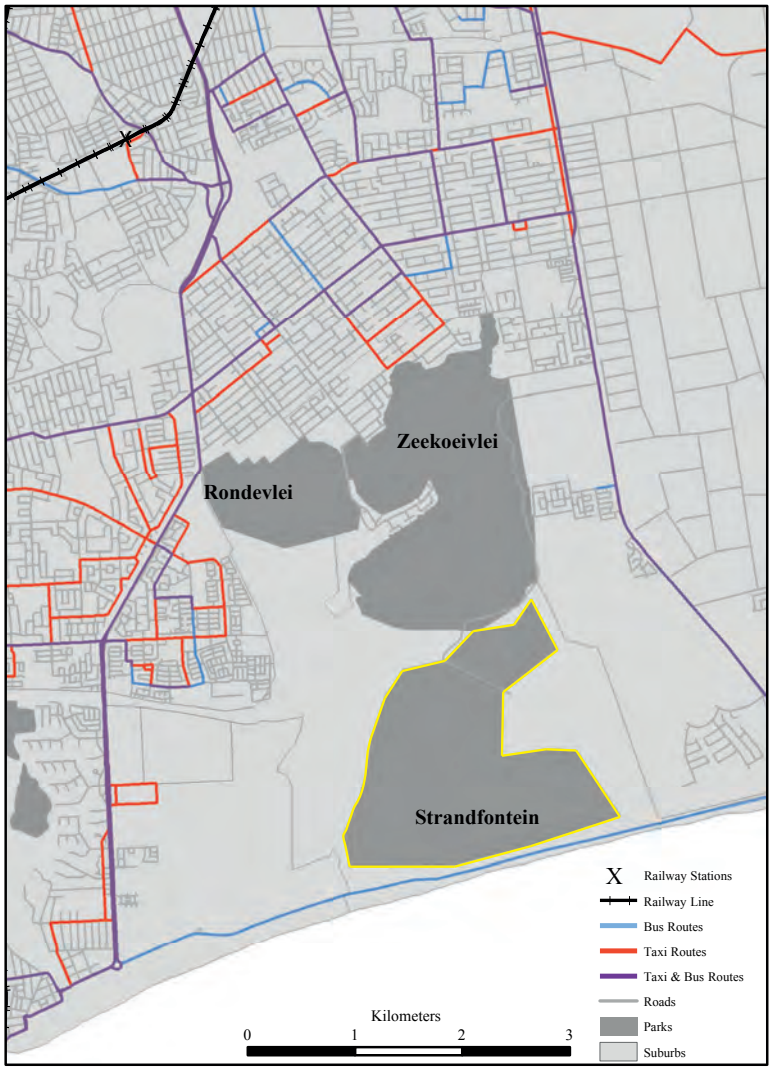
Mode of Transport

G



Frequency of Visits

J



H

Reasons for Car Transport Choice	
Distance	53%
No other way	27%
With child/children	13%
Convenient	7%

I

Reasons for Visiting Park	
Birding	75%
Photography	20%
Curiosity	5%

FIGURE 22: Strandfontein Birding Area Data (n=15)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map

Maps source: City of Cape Town Maps Department, 2009

Figures source: As gathered in study

6.3.7 Zandvlei Nature Reserve

A total of 75 users were interviewed over the survey period in Zandvlei. An overwhelming percentage of users (97%) were surveyed at Zandvlei Park Island. Only two visitors were utilising the main office area of the Zandvlei Nature Reserve over the survey period. There was a wide variety of age groups using the green space, although a large portion of users were between the ages of 40 and 69 (63%) (Fig. 23a). Elderly and teenagers aged 16-19 were underrepresented at the reserve, signifying 1% and 3% of the total users, respectively. The majority of users were white South Africans (75%), while coloured South Africans accounted for 20% of total visitors (Fig. 23c). Retirees made up nearly one third of users at Zandvlei (Fig. 23d). Over three-quarters of users came from Muizenberg, and more specifically, 68% from Marina da Gama, the neighbourhood where Zandvlei Park Island is located (Fig. 23e). Approximately 10% of users reside in Steenberg, a suburb adjacent to Zandvlei, while another 10% come from Grassy Park, another nearby neighbourhood.

The majority of users (69%) travelled to Zandvlei by car (owned or shared), while nearly a third of users walked (Fig. 23f). Almost half of those who travelled by car cited dogs as the reason for their transport choice (Fig. 23h). Zandvlei can be accessed via public transport (minibus taxis and buses) along Military Road in Steenberg; alternately, minibus taxis and buses travel along Prince George Drive past Marina da Gama (Fig. 23j). The nearest train station is located at Steenberg, approximately 2 kilometres distance.

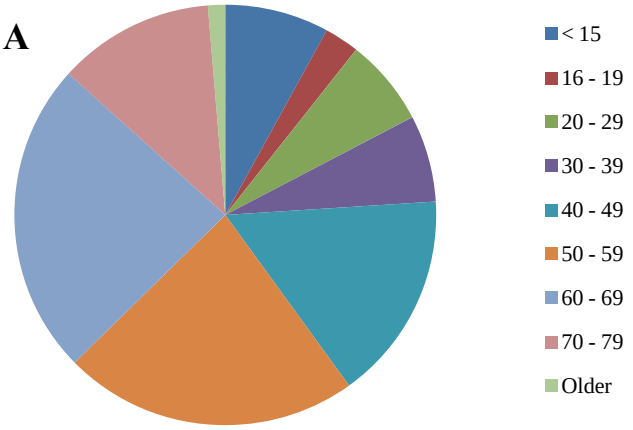
Nearly half of the users visited Zandvlei for dog walking, and almost a quarter of visitors came for exercise (Fig. 23i). Fishing was a popular activity in Zandvlei, accounting for 10% of users to the reserve. Visitors to Zandvlei frequent the green space regularly, with nearly half of users coming weekly, and almost a third visiting daily (Fig. 23g).

The results for Zandvlei show a sharp contrast between the main office area and Zandvlei Park Island. Two visitors, surveyed over five visits, demonstrate an extreme lack of utilisation of the area, while the majority of users at Zandvlei Park Island were from the surrounding neighbourhood. The general trends showed mainly white, middle aged users (40 to 69) at the island, with nearly a third of users retired. While quite a few users travelled by car, much of this was due to dogs, which accounted for the main reason people visited the reserve. In comparison with other green spaces, users were more likely to walk to Zandvlei and visit more frequently.

6.3.8 Zeekoeivlei Nature Reserve

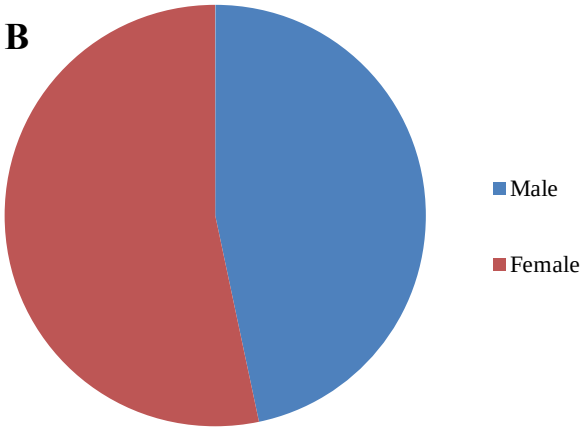
At Zeekoeivlei, 107 individuals were surveyed over five visits. Users covered a variety of age groups but a distinct lack of representation was noted in teenagers aged 16 to 19 (2%) and elderly over 70 (1%) (Fig. 24a). There were considerably more men at Zeekoeivlei than women, with a male-female split recorded at 66% to 34% (Fig. 24b). The majority of users (69%) were coloured South Africans, while the rest were white (14%)

A



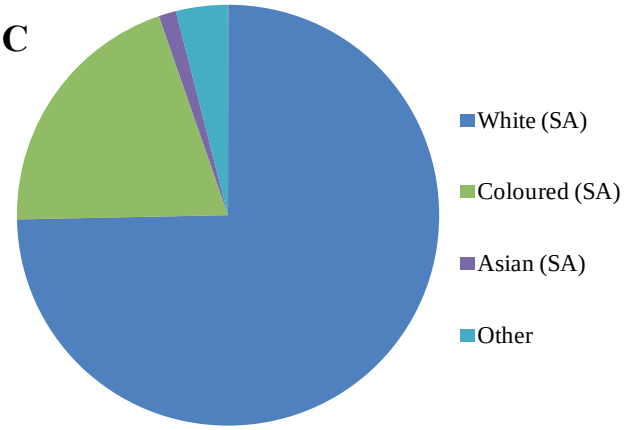
Age Group

B



Gender

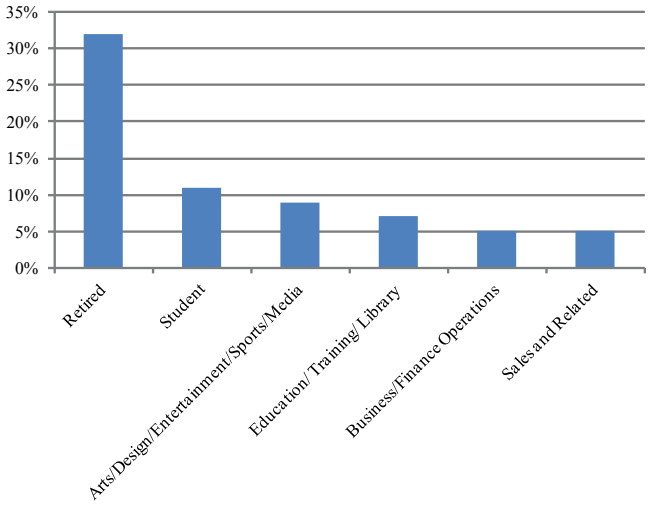
C



Ethnicity

Top 5 Occupations

D



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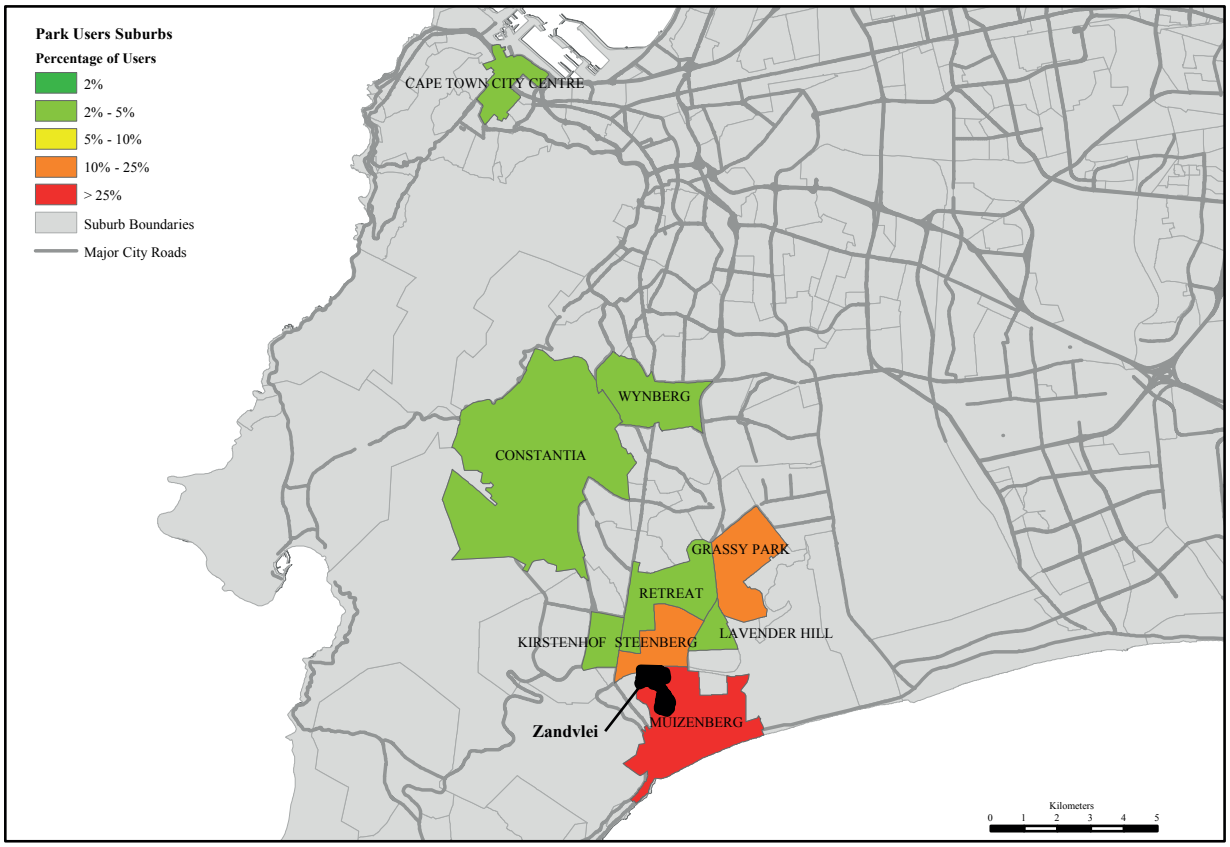

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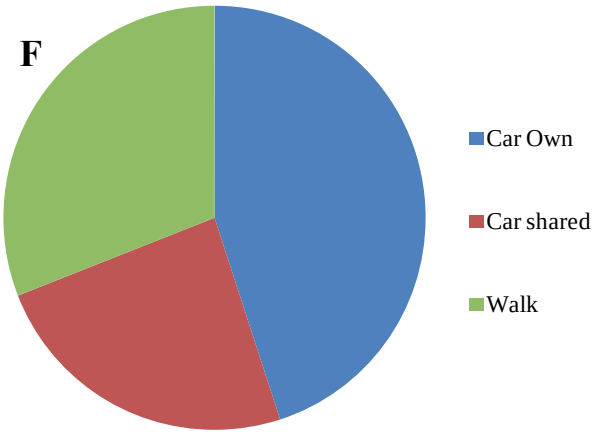
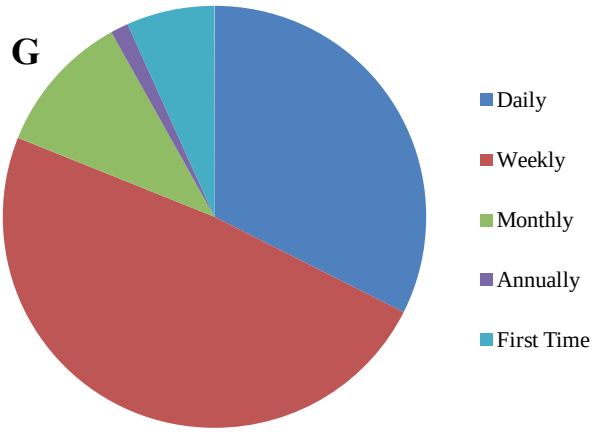


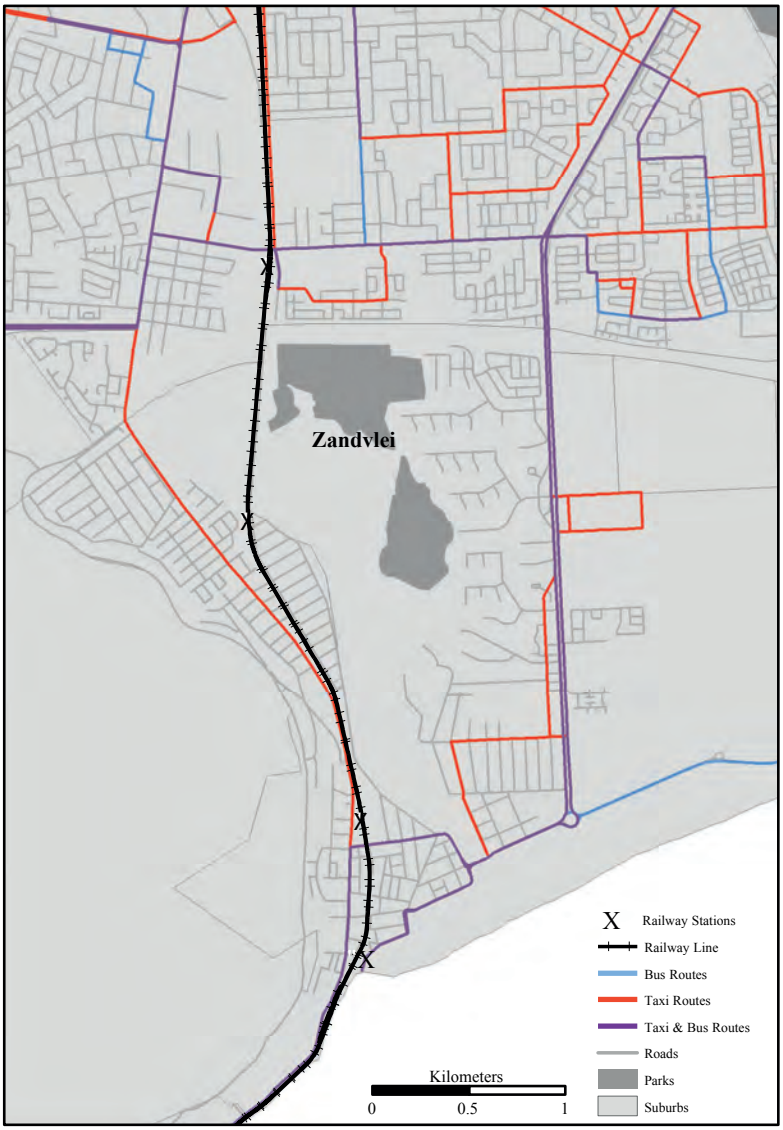
Mode of Transport

G



Frequency of Visits

J



H

Reasons for Car Transport Choice	
With dogs	47%
Distance	17%
Own a car	15%
Convenience	8%
Medical issues	4%
Safety concerns	4%
No public transport options	2%
First visit, not sure of location	2%
Time	2%

I

Reasons for Visiting Park	
Dogwalking	48%
Exercise	22%
Fishing	10%
Fresh air	8%
Beautiful location	3%
Nature appreciation	3%
Curiosity	2%
Photography	2%
Relax	1%

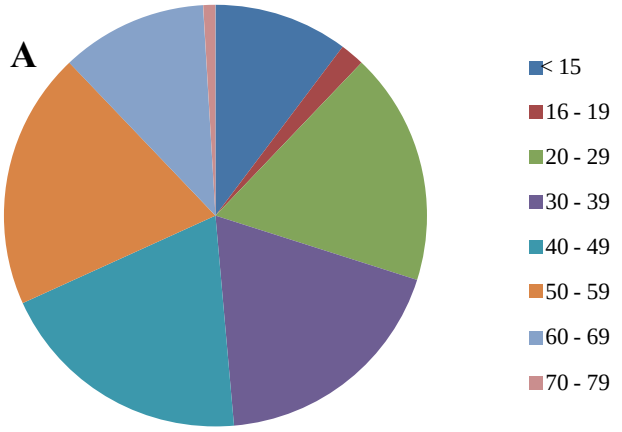
FIGURE 23: Zandvlei Nature Reserve Data (n=75)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map

Maps source: City of Cape Town Maps Department, 2009

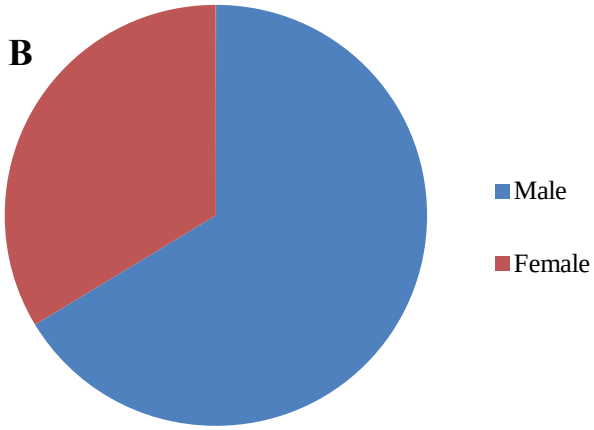
Figures source: As gathered in study

A



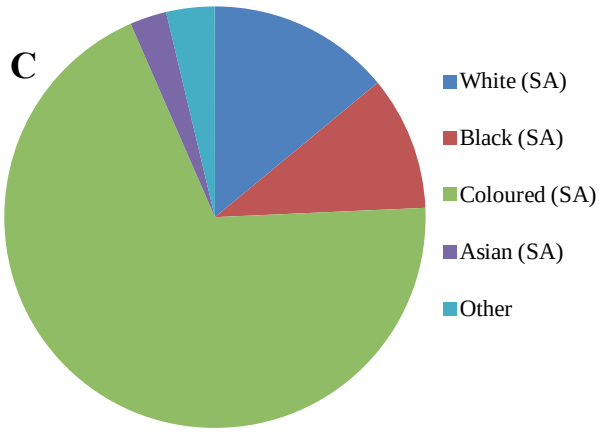
Age Group

B



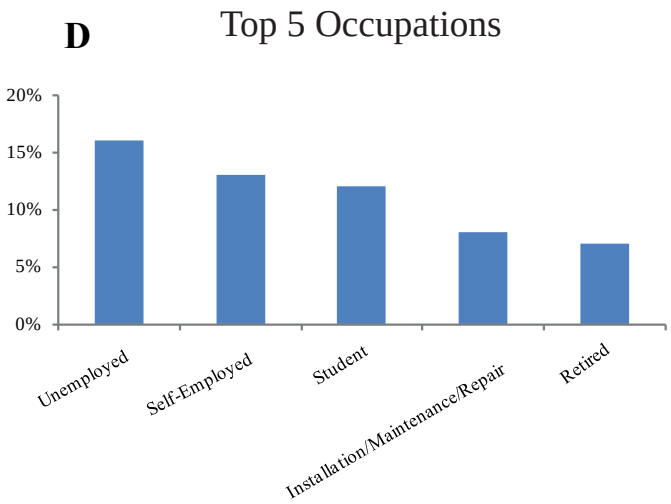
Gender

C



Ethnicity

D



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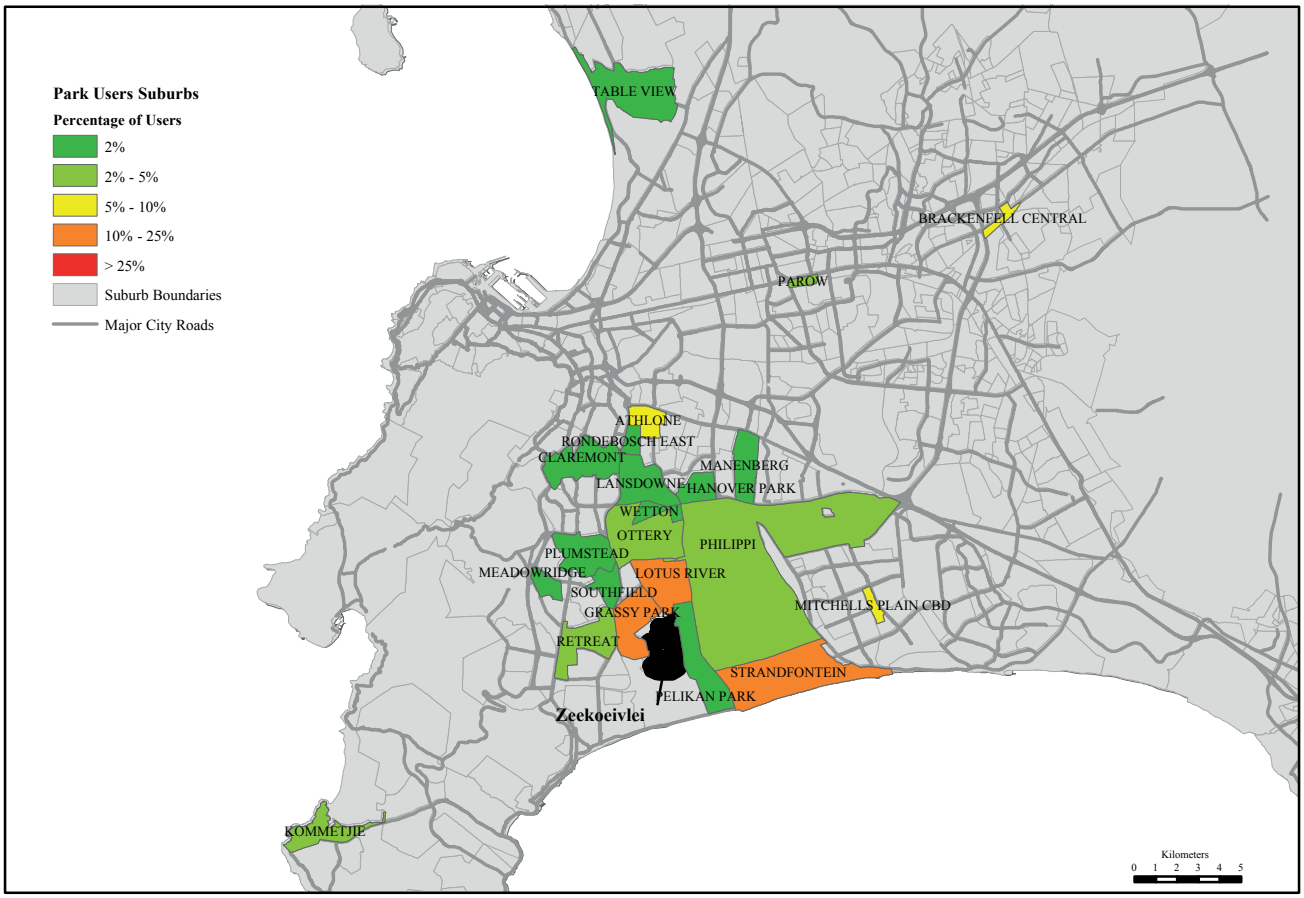

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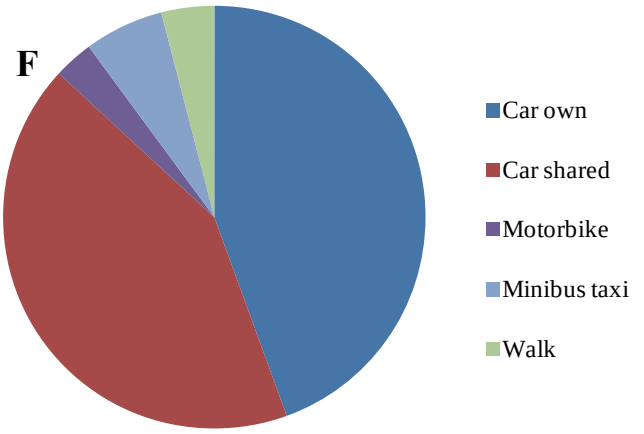
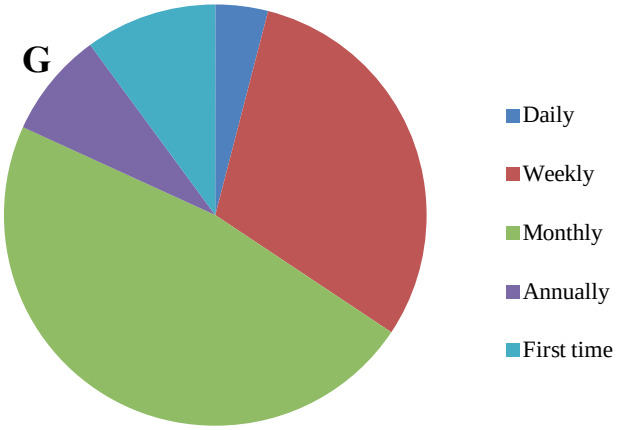


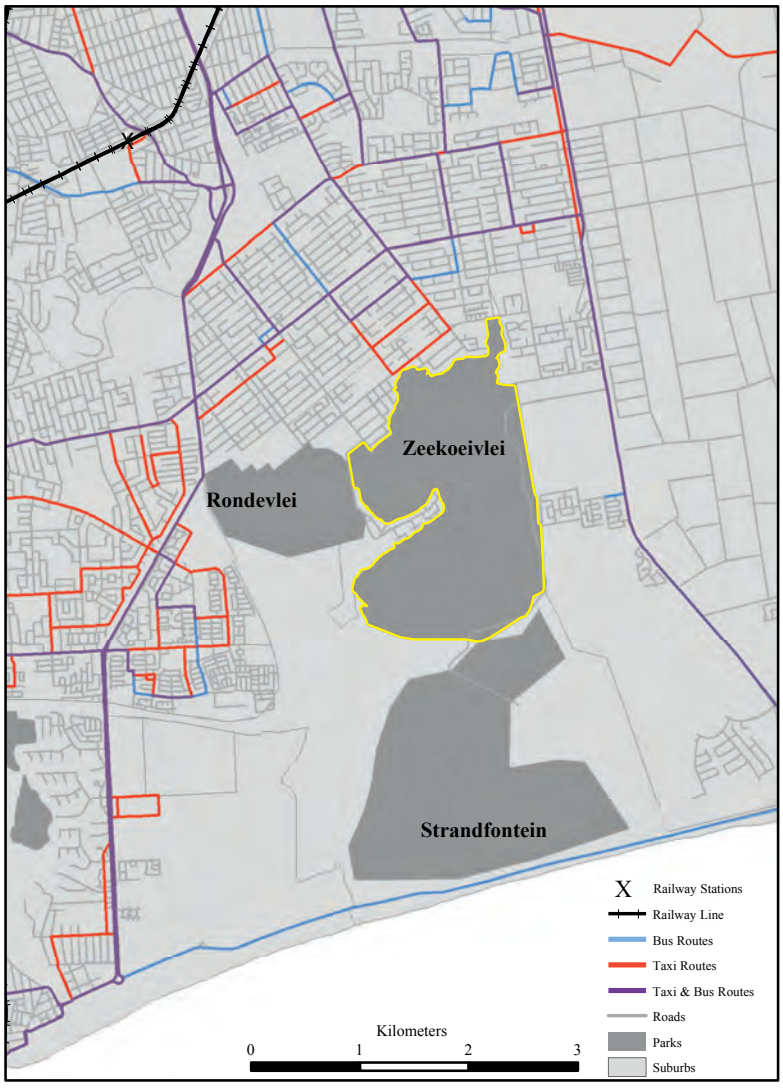
Mode of Transport

G



Frequency of Visits

J



H

Reasons for Car Transport Choice	
Convenience	23%
Outing with children	18%
No public transport options	15%
Distance	14%
Needed for recreation equipment	8%
Safety	7%
Work	6%
On route	5%
Age	4%
Own a car	1%

I

Reasons for Visiting Park	
Braai	20%
Relax	20%
Fishing	16%
Beautiful location	13%
Curiosity	13%
Recreation	7%
Work	4%
Exercise	3%
Fresh air	2%
Nature appreciation	1%

FIGURE 24: Zeekoeivlei Nature Reserve Data (n=107)

Park user data analysed by (A) Age Group (B) Gender (C) Ethnicity (D) Top 5 Occupations (E) Suburb Map of Park Users (F) Mode of Transport (G) Frequency of Visits (H) Reasons for Car Transport Choice (I) Reasons for Visiting Park (J) Transport Map

Maps source: City of Cape Town Maps Department, 2009

Figures source: As gathered in study

and black (10%) (Fig. 24c). The single largest occupational group is 'unemployed' (16%) (Fig. 24d). Visitors to Zeekoeivlei generally came from the Southern Suburbs (85%), with nearly one-fifth residing in Grassy Park, and 11% from Strandfontein, two suburbs adjacent to the reserve (Fig. 24e).

A vast majority (88%) of users accessed the nature reserve via car (owned or shared) (Fig. 24f). Users cited various reasons for using a car; among the most popular responses were convenience, outing with children, no public transport options, and distance (Fig. 24h). Public transport to Zeekoeivlei is identical to that of Strandfontein, which is minibus taxis and buses travel along Strandfontein, about 500 metres from the entrance to Zeekoeivlei, along a dirt road (Fig. 24j).

People visited Zeekoeivlei for a variety of reasons. The top five reasons included to braai (20%), relaxation (20%), fishing (16%), visit a beautiful location (13%), and curiosity (13%) (Fig. 24i). Users to Zeekoeivlei mostly visited monthly (47%) or weekly (30%) (Fig. 24g).

Zeekoeivlei attracted a wide variety of people, although there was a noticeable gap of teenagers ages 16 to 19, as well as elderly visitors (over 70). The reserve had substantially more male visitors than female, with most of the visitors being coloured South Africans. The majority of users came with a private car on a weekly or monthly basis, as public transport access is difficult at the nature reserve. People came to Zeekoeivlei for a number of reasons; the most popular being to *braai*, relax, or fish. Visitors tended to come in groups.

6.4 Conclusion

The data presented in this chapter demonstrates both overall trends throughout the City, across the eight reserves, and individual differences between them. Analysing the data as a whole allows for a comprehensive investigation into access of green space in Cape Town. However, understanding the unique and distinct differences at each green space, and the reason for these differences, is integral to addressing the challenges to urban green space access in the City, and may be useful to similar approaches in other cities.

7 Discussion

Access to green spaces is crucial to securing the benefits which public green space provides. Physical access refers to the distribution of green spaces within cities and the proximity of green spaces to where people reside and work, as well as possible barriers to access, such as long distances, unsafe routes, and entrance fees (Wendel et al., 2012). Psychological access relates to green spaces being attractive to and safe for potential users, so that they may fulfil the purpose of visiting a green space (ibid.). Access to green spaces within Cape Town varies throughout the city. While some green spaces are well-utilised, many remain vacant and idle. Evaluation of each of the eight green spaces reveals its own story of usage, yet it is important to consider the entire narrative for the future of Cape Town's public green spaces.

Many factors may influence access to green spaces in an area. Green space access falls into two major categories: actual accessibility and potential accessibility (Dai, 2011). Some barriers to the spaces are actual barriers (i.e. public transport, cost, physical mobility issues), while other barriers are potential, such as lack of interest or knowledge of park programmes and facilities. Users numbers at each green space were vastly different, despite each space being visited an equal amount of time. The number of users surveyed at each location varied between seven and 168, demonstrating a considerable difference in use of these spaces. These eight green spaces represent a subset of Cape Town's parks, located in different neighbourhoods across a racially and economically divided city. Cape Town's history of apartheid planning is a pertinent factor throughout the study, and affects many of the issues around green space access, which include proximity, public transport, safety and security, spatial development of Cape Town, park interests, and information barriers, that alter how users engage with these eight different green spaces. In general, the majority of users visiting the green spaces came from suburbs within a one kilometre distance from the green space, and travelled by personal vehicle or carpooled. Very few users used public transport to access the green spaces, and many cited safety concerns in the surrounding neighbourhoods of the green space. The racial breakdown of users contrasted with that of the 2011 Census, indicating that substantially more white Capetonians access green space than other ethnicities, which may be a reflection of the City's spatial development (as addressed in section 7.4). Park interest and lack of awareness had an effect on how and whether users utilised green space. In the study, the principal reason the public did not visit green spaces was a lack of awareness or information regarding the green space. As the study reveals, both actual and potential barriers affect how urban green spaces are accessed in Cape Town.

7.1 Proximity

According to the literature, the distance to a green space is the most important factor in determining access; the closer a green space is to an individual's home, the more it is used (Coles & Bussey, 2010). The findings of this current study support this view given that the majority of users live within a 2 kilometre radius of the green space. Strandfontein, Edith Stephens, and Zeekoeivlei are the exceptions to this, for differing reasons. Users at Strandfontein were more likely to visit from abroad or outside of Cape Town, as the bird-specific tourism aspect served as a significant draw to a wider and more distant group. At Edith Stephens, the park appears to be disregarded by the public, including by close residents. In Zeekoeivlei, many users did come from nearby suburbs, but spanned a larger range than the other green spaces, perhaps due to the location of the nature reserve and lack of public transport. This falls in line with studies which advocate for green space within close proximity in order for users to take full advantage of their benefits. The European Environmental Agency (EEA) recommends that people have access to public green spaces within 15 minutes walking distance of their homes while English Nature (EN) goes even further by recommending that urban residents have accessible green space less than 300 metres from their home (Barbosa et al., 2007). It is clear, in this study, that green space users are more likely to utilise a green space and benefit from its services if it is within close proximity to their home. However, simple proximity to an urban green space does not always determine use. In the case of Edith Stephens, Zandvlei Nature Reserve (main office area), and Strandfontein, these locally available green spaces were not used by residents, which suggests that other barriers exist beyond proximity.

The frequency of use of green spaces has also been found to be strongly correlated with the distance that respondents must travel to access the green space (Toftager et al., 2011). While this study did not analyse the relationship between frequency of use and distance, it is of note that users at certain green spaces where exercise and dog walking were the most common reasons for visiting, such as Rondebosch, Meadowridge, and Zandvlei (Park Island), a majority of users visited daily or weekly. The majority of these users also live in suburbs within one kilometre of the green space and had higher percentages of users walking to access the green space. In order for green space users to utilise green spaces, they must have the availability of such spaces within their local neighbourhoods, otherwise distance stands as a barrier to access. According to a study conducted by O'Farrell et al. (2012) that analysed the proximity of schools to green spaces, schools in the low-income areas of the Cape Flats had fewer easily accessible natural remnants, or green spaces, and less capability in affording transport than schools in more affluent areas in Cape Town, resulting in less exposure to green spaces for the students. This also relates to the spatial development of the City of Cape Town, and the effects of apartheid planning on green space distribution, which will be discussed later in this section.

While ‘proximity’ or ‘distance’ was not one of the top ten total reasons for visiting the green spaces, it was likely a factor given the percentage of users who live in close proximity to the green space and the public who cited distance as a reason for not visiting the green space. Data from this study suggests then that distance affects people’s willingness to visit the green space, which leads to environmental justice concerns. Given Cape Town’s history of segregation and exclusion through apartheid planning, questions of equitable access to green spaces for all Capetonians arise. Needs-based assessments are one way of addressing issues of equity rather than equality, which focuses on the green space needs of a community (equity), rather than simply distributing an equal number of green spaces throughout the various neighbourhoods in the City (equality). The aim, of everyone in Cape Town being able to experience public green space to their own level of enjoyment, may not necessarily be reached by the same means. For example, providing a dog park in one neighbourhood and a sports field in another may achieve the same results, i.e. a well-used green space and a satisfied community. Needs-based assessments serve a practical purpose by targeting groups who are most likely to use or need access (because of limitation based on age, ability, or resources) to green space within walking distances (Boone et al., 2009). Such assessments would be helpful in determining how far individuals are willing to travel to green spaces and what they want out of those green space experiences. Children, the elderly, those without cars, and low-income neighbourhoods have the greatest needs for green spaces within walking distance (Talen, 2003; Wolch et al., 2005). As evidenced by the data collected in this project, teenagers aged 16 to 19, and senior citizens over the age of 80 were the least likely users of green spaces. Ease of mobility and lack of decent transport options may be limitations for these age groups. Those without cars may also experience challenges. The vast majority of green space users accessed green spaces by a private car, either owned or shared (carpooling). For those with mobility issues and the carless, public transport could be a viable alternative, yet data shows that public transport options are underused or are extremely limited, as a means to access green spaces.

7.2 Public Transport

Public transport can be a barrier to access of green space in Cape Town. Use of public transport was extremely limited by green space users, with the majority travelling by car, partially because of the lack of public transport options. In some cases the cost of transport was prohibitive, and walking was not an option due to safety. At a number of green spaces, taking public transport would involve some combination of walking, taking the train, and switching to a minibus taxi or bus. When travelling with a family or a number of young children, this is not a viable method of transport considering the amount of effort, time, and money it would entail. Cost can be a major deterrent, particularly for those with lesser financial means. Urban poor often have less mobility because of lower car ownership, low-wage jobs, and single parent families (Boone et al., 2009; Wolch et al., 2005). Those who travelled by car to reach the green spaces often stated their reason for driving was because they were

travelling with children. Taking various methods of public transport to access a green space simply to take a walk with children is a barrier in itself.

As an individual without the burden of small children or an elderly person in tow, it may be possible to navigate the public transport system, but safety concerns become a consideration when travelling alone. In the case of Strandfontein, a pedestrian must walk 3.5 kilometres through Zeekoeivlei to access the entrance gate; there are no alternatives. To take advantage of what is offered at Strandfontein (birding), one must have a car or vehicle to travel around and visit the various filtration ponds. Even when walking is a feasible alternative, many users had concerns over safe walking routes, particularly in Zeekoeivlei, Strandfontein, and Zandvlei. Fear of crime and other safety-related concerns discourage neighbourhood walking (Foster & Giles-Corti, 2008) which may prohibit users from accessing green spaces. Data from this study supports this view where the majority of users travelled by car, owned or shared, to access the green spaces. One user chose to drive her car to Zandvlei Park Island, despite living only one kilometre away, due to the safety concerns of walking through a low income neighbourhood. The public transport system does not seem linked to green space access, and access is further hindered by safety and security considerations within neighbourhoods. As referred to in 3.10, Mammon et al. (2008) call for a provision of movement corridors, connecting green spaces, social institutions and facilities, and utility services, creating an 'accessibility network.' In order for green space access to improve, there must be a connection between public transportation and urban green spaces within Cape Town, as well as an increase in the safety of local neighbourhoods, so that all Capetonians may take advantage of the services of the City.

7.3 Safety and Security

People's perceptions of safety and security within and around urban green spaces can act as barriers to accessing these spaces. According to a number of studies, residents would be less likely to utilise green spaces if they are viewed as unsafe, or as a setting where illegal activities take place such as drug use and gang related behaviour (Kaczynski & Henderson, 2008; Durant et al., 2009; Cohen et al., 2010). The findings of this current study support these views, and surveyed members of the public cited safety as a barrier more frequently than accessibility, demonstrating that safety is a critical issue in keeping Capetonians out of public urban green spaces. The public commented that they preferred enclosed places for children, with a wide range of facilities to attract other users due to safety concerns. Issues of crime, such as theft, assault, drug use, and vagrancy, were major fears. One regular user at Rondebosch Common avoided running in winter because it was too dark in the early morning, and she did not feel safe running alone (personal communication, surveyed user, March 2013). High neighbourhood crime rates and hazardous traffic patterns may also reduce green space usage and decrease the potential benefits of a green space. Physical proximity to a green space may provide the potential for green space usage, but neighbourhood disamenities may reduce the likelihood of green space usage due to fear (Weiss

et al., 2010). Data from this study validates this position, where some locally available green spaces, situated in areas with high crime, were not used by local residents. In both Edith Stephens and Zandvlei (main office area), green space users may be deterred by the reputation of the neighbourhood and surrounding areas.

A number of both users and the public were concerned about visiting certain green spaces alone, or with young children. Improving security and encouraging a police presence in these spaces was suggested in order to promote more use. Concerns about various factors related to safety may inhibit the use of green spaces, which may lead potential users to avoid green spaces altogether or seek other green spaces (Weiss et al., 2010). In this study, Zandvlei (at the main office) and Edith Stephens were under-utilised spaces, both located in areas where crime and safety were cited as concerns by the public. It would appear that residents are avoiding these green spaces, at least partially due to safety and security concerns. It is unsurprising, given the attitude of some communities in Cape Town that green spaces are unsafe places characterised by criminal activity (CoCT, 2008; Ashwell, 2010). Brighter lighting, increased police and citizen patrols, effective vegetation management to increase sight lines, and promoting activity in sparsely used areas are some important ways that personal safety can be increased in urban green space settings (Loewen et al., 1993; Schroeder & Anderson, 1985). In order to encourage Capetonians to access and make full use of the public green spaces within the City, great hurdles must be overcome to improve the safety and security of all neighbourhoods and suburbs.

7.4 Effects of the Spatial Development of Cape Town

The spatial development of Cape Town and resulting neighbourhood division has profound effects on the ability of Capetonians to access green space within the City. In this study, the data was most evident in the ethnic demographic information collected, which was not indicative of Cape Town's population. According to the 2011 Census, the City is comprised predominantly of coloured (42%) and black African (39%), with whites (16%), Asian (1.4%), and other (2%) making up the remainder (CoCT, 2012). In comparison to the data collected in this study, this suggests there may be an underrepresentation of black Africans utilising park services in Cape Town. Due to the unique circumstances that exist within Cape Town, it is important to acknowledge the racial demographic data within the suburbs in which park-goers reside. The City remains deeply divided as a result of apartheid planning, where settlement patterns emphasised social segregation and physical fragmentation (Turok, 2001). Wealthier suburbs with prosperous economic centres fringe the coastline and the base of Table Mountain, starkly contrasting the overcrowded, poverty stricken informal settlements on the Cape Flats. Institutional practices and market forces continue to reinforce spatial division, leaving Cape Town one of the least altered cities in the country post-apartheid (ibid.).

Through data captured in the Cape Town Census 2011, illustrated in Table 8, an analysis of the ethnic breakdown by suburb is conducted (CoCT, 2012). Die Oog, Meadowridge Common, Strandfontein, and

Zandvlei all drew a majority of white park users (67% and above), and in most cases, a majority of users resided in suburbs with a predominantly white population (66.5% and higher). It is unsurprising, then, that most of the green space users are white when the majority of users come from primarily white suburbs. However, Zandvlei (Park Island) also had a white majority (75%), with most park patronage coming from those living in Marina da Gama, which is 58.5% white and 37% coloured. About 20% of these users also came from suburbs with mixed populations or predominantly coloured populations; coloured park users comprised 20% of the total users at Zandvlei. One might expect that coloured representation would be higher in Zandvlei, given the ethnic breakdown of the neighbouring communities and considering that the majority (85%) of users live within suburbs located one kilometre distance from the green space. The assumption is that white and coloured residents in nearby neighbourhoods have similar access to Zandvlei Park Island, given proximity, yet the green space clearly is underutilised by coloured residents. The data suggests that other barriers exist in green space access, and one possibility may be economic. According to the Cape Town Census 2011, white Capetonians generally earn more than coloured Capetonians, with 60% of whites having a monthly household income of over R12,800 ($1,280) as compared to 23.3% of coloured Capetonians (CoCT, 2012). White community members in Zandvlei, then, may be more likely to own a car, thereby increasing mobility and access to green spaces. An investigation as to why there is a contrast between white and coloured green space access at Zandvlei Park Island, and what other barriers are faced, may be of worth.

In green spaces with a predominantly coloured patronage, such as Rondevlei and Zeekoeivlei, the majority of users reside in suburbs with high percentages of coloured people (53% and higher). In Rondebosch Common, where green space use is more mixed, the surrounding suburbs are also more diverse. While a number of the suburbs do have a majority white population, other suburbs such as Athlone, where 14% of green space users reside, is 70% coloured and Mowbray, where 5% of park goers live, is 47% black African. Kenilworth, Wynberg, and Observatory also have more diversity and account for 10% of green space users' suburbs of residence. The racial breakdown of users appears to reflect the racial breakdown of the suburbs surrounding the green spaces, where many of the users reside.

Data then suggests that the lack of black African representation in the green spaces in this study may simply be because these green spaces are not in suburbs with large black African populations, not because black Africans do not visit green spaces. As discussed earlier, the distance one is willing to travel to visit a green space is limited. Others in the study stated they prefer to visit larger parks, such as Table Mountain National Park, or beaches. A similar study engaging with green spaces in predominantly black suburbs may yield interesting results.

Table 8: Cape Town Suburbs by Ethnic Percentages

Suburb	Black African	Coloured	Indian/Asian	White
Athlone	3.21	69.66	23.45	3.69
Bergvliet	2.15	5.74	0.08	92.06
Brackenfell	2.95	30.47	0.80	65.78
CBD	21.25	22.22	6.31	50.19
Capri Village	4.61	3.92	0.00	91.47
Claremont	6.62	9.27	3.76	80.35
Constantia	5.99	6.08	1.13	86.80
Diep River	1.77	14.76	1.44	82.03
Edgemead	1.32	4.71	0.56	93.42
Fish Hoek	1.60	1.85	0.77	95.78
Grassy Park	2.76	94.03	2.40	0.80
Hanover Park	1.21	97.11	1.60	0.08
Heathfield	2.32	76.72	3.13	17.84
Kenilworth	12.50	16.14	3.73	67.63
Kenridge	3.37	4.92	0.95	90.76
Khayelitsha	99.42	0.54	0.01	0.03
Kirstenhof	1.03	4.44	0.34	94.19
Kommetjie	1.39	2.43	0.00	96.17
Lakeside	1.45	6.71	0.43	91.36
Lansdowne	3.17	72.55	9.58	14.70
Lavender Hill	1.58	98.10	0.24	0.07
Lotus River	1.34	97.42	0.81	0.43
Maitland	15.11	71.51	2.52	10.85
Manenberg	4.51	94.36	0.89	0.24
Marina da Gama	3.51	37.07	0.88	58.54
Meadowridge	1.35	4.01	0.73	93.91
Mfuleni	91.10	7.68	0.08	1.14
Milnerton	4.28	7.66	2.03	86.02
Mitchell's Plain	9.43	89.60	0.62	0.34
Mowbray	46.62	14.06	2.63	36.68
Muizenberg	26.65	35.99	1.40	35.96
Newlands	7.30	7.73	2.23	82.73
Noordhoek	30.68	2.69	0.24	66.38
Observatory	20.28	18.78	3.50	57.42
Ottery	4.29	72.17	4.61	18.93
Parow	3.17	53.02	1.80	42.01
Philippi	94.37	5.47	0.11	0.05
Pelikan Park	6.61	58.51	33.99	0.90
Pinelands	6.21	7.79	2.49	83.52
Plattekloof	3.70	8.94	6.39	81.01
Plumstead	2.55	19.52	2.73	75.20
Retreat	2.56	94.22	1.38	1.84
Rondebosch	14.00	7.74	5.63	72.63
Southfield	3.47	42.68	1.21	52.66
Steenberg	3.44	95.09	1.15	0.33
Tokai	26.36	39.18	0.31	34.15
Vredehoek	6.77	9.09	1.38	82.75
Westlake	24.19	26.49	0.40	48.92
Woodstock	7.56	67.46	7.22	17.75
Wynberg	8.42	49.82	11.93	29.83
Zeekoeivlei	3.08	78.78	4.91	13.22

Data compiled from Cape Town Census 2011 (CoCT, 2012).

Another point is that the green spaces in this study were chosen because they were designated conservation areas, which are run by the City of Cape Town. It must be noted that none of these areas exist within predominantly black neighbourhoods and suburbs. Cape Town's urban development is largely a result of apartheid planning, with the urban poor relegated to the Cape Flats area, away from the central business district and employment areas (Ewing & Mammon, 2008). According to Wilkinson (1998), post-apartheid efforts sought to address the disproportionate racial and socioeconomic public service provisions with a vigorous housing programme, the Reconstruction and Development Programme (RDP). The main focus of RDP housing was to create as many homes for the poor and previously homeless at the lowest possible cost (ibid.). However, the provision of public green spaces within the RDP suburbs is limited (ibid.), and often these RDP suburbs were constructed on the periphery of the city (Ewing & Mammon, 2008). Many studies show that there is an inadequate amount of green spaces in socioeconomically deprived residential areas (Richardson et al., 2010; Wolch et al., 2005). The amount of green spaces available as compared to population demands is critical, yet they often are mismatched as disparities exist among different races and social status (Dai, 2011). A study conducted by Willemse and Donaldson (2012) revealed there is a need for sustainable and well-maintained community neighbourhood parks (CNPs) in Cape Town's townships. According to Willemse (2010), neighbourhood park space in Cape Town showed that low income areas (mostly townships) have 2.2 m^2 of park area per person, compared to 2.6 m^2 for middle-income and 7.1 m^2 for high-income residential areas. As mentioned earlier, data from this study leads to questions of environmental justice within Cape Town. Equity in green space access among socioeconomic groups, and subsequently racial groups, continues to be a struggle in the City. This study supports this view of inequitable access where apparently wealthier white members of society enjoy greater access to public green spaces. Half of the users involved in the study were white, yet whites only comprise 16% of the City's population (CoCT, 2012). The data suggests that white Capetonians are more likely to use urban green spaces, which may be a result of better access to these spaces.

In addition to lower income groups having less available green space, there is the question of the quality of public green space in Cape Town. Environmental justice can only be achieved if historically disadvantaged groups, such as township dwellers, are exposed to better green space locations and conditions, which are based on their own experiences and perceptions. Willemse and Donaldson's study (2012) divulged that community members in Cape Town wanted secure facilities, play equipment, more grass and trees, and clean and maintained spaces. The communities' knowledge, experiences, preferences and future park aspirations must be incorporated into planning programmes and budgets (Ruiters 2001). "City planners should pay attention to the areas short of green space accessibility and prioritise the socioeconomically deprived areas when establishing new parks or expanding existing parks" (Dai, 2011, p. 243). Creating equitable access to green space within the City is essential to the population, due to the many health benefits that green spaces provide, be it physical,

mental, emotional, and psychological. All citizens of Cape Town must be able to access such spaces, as everyone should be entitled to these benefits. Access is an important aspect of fair and equitable sharing of green space benefits. As set forth by the 1996 South African Constitution, all South Africans have "the right to an environment that is not harmful to their health and wellbeing; and to have the environment protected, for the benefit of present and future generations" (Constitution of the Republic of South Africa, p. 1251-2).

7.5 Park Interest

Park amenities and maintenance can act as barriers to green space use; people seek out well-maintained, safe green spaces with desirable, appropriate facilities, and when these needs are not met, these green spaces may become underutilised or neglected. In this study, park use was specific to the nature of the green space and its facilities. The size of a green space plays a role in what purpose it serves to local residents (Miyake et al., 2010), which was evident in this study as certain large green spaces were predominantly used for dog walking and exercise, while other smaller green spaces had more specific attractions such as birding or nature appreciation (Fig. 1-8i). While small green spaces may contribute to the emotional and physical well-being of residents and contribute to walkability within the neighbourhood, their benefits are different than those regularly used for active recreation (ibid.). Users took advantage of the large open space at Meadowridge Common, Rondebosch Common, and Zandvlei Park Island to walk dogs and exercise, while Die Oog primarily attracted small children to feed the various water birds. Strandfontein is predominantly a space which draws birders, from Cape Town and beyond; as stated earlier, it has a reputation as one of the top five water bird sites in South Africa. Rondevlei also attracts birders, as well as nature enthusiasts, while Edith Stephens' main draw appears to be fishing. Zeekoeivlei, as a larger reserve, offers a greater variety of activities such as fishing, boating, and braai facilities. Each green space draws certain users to it, with specific interests. This may act as both a barrier and an opportunity. For example, someone who is not interested in birding is unlikely to visit Strandfontein; similarly, a visitor without a dog may find no reason to visit Meadowridge Common. Yet marketing these green spaces to their targeted user could increase the number of visitors each green space hosts. Acknowledging and understanding what specific green space users want and making the appropriate improvements or modifications may attract more like-minded users to the green space and enhance community engagement of the space. Data from this study reveals that when a green space does not offer appropriate services which correspond with the needs of the community, the space will remain vacant and idle, thereby acting as a barrier to green space access. Recognising and celebrating these differences in green spaces may be one way for the City to increase park patronage and improve access. City officials and urban planners must examine the varying ways in which users engage with specific green space and enhance those ways to attract more users.

This could also prove useful to the conservation of Cape Town's green spaces. Cape Town has incredibly unique biodiversity, located within the CFR, which is considered one of 34 global "biodiversity hotspots" (Conservation International, 2013). Conservation of the Cape Town's 190 endemic plant species is crucial, yet urban development and housing demands threaten the future of the limited vegetative remnants still remaining in the City (CoCT, 2008). While there is strong environmental legislation within South Africa, conflicting demands, fiscal constraints, and a lack of execution delay any enforcement or action (ibid.). Rather than simply pushing for conservation of green spaces, perhaps a balance can be struck between both conservation and recreational park use. Designating certain areas along paths or walking trails within a green space for threatened and endangered plant species may be one method of combining different agendas, thereby providing walking areas for exercise as well as protected spaces for flora. Educational information signs might be employed to describe vegetation types and the importance of conservation. This seems to work, with limited success, in Meadowridge Common. The green space is mainly visited by users interested in dog walking, but many possess knowledge about the area's conservation status and existing biodiversity species. All eight green spaces within this study are considered conservation areas, with varying degrees of flora and fauna worth protecting. Interestingly, the majority of park users did not visit the green spaces with a conservation agenda in mind though users cited 'nature appreciation' and 'beautiful location' as their reasons for visiting the green space. This suggests that while people do visit urban green spaces to enjoy nature and appreciate its beauty, they may not be aware that the green space they are in contains vulnerable species, or recognise the importance of conservation within the City. In certain green spaces, such as Rondevlei, nature conservation is a goal of the green space, where many users engaged in environmental education. Clearly, there is interest and appreciation in nature and environmental education by some green space users, and perhaps linking conservation more heavily with other green space interests, such as exercise, dog walking, and bird viewing, could promote more interest in the conservation of biodiversity sites throughout Cape Town.

Investigating why users visit specific green spaces in Cape Town could also be useful in addressing the underrepresentation of older teenagers in these spaces. In this study, data shows very few teenagers, aged 16 to 19, visited the eight green spaces, which suggests they do not have appropriate facilities for this age group. This stands out as a barrier faced by older teenagers to accessing green spaces in Cape Town. Providing healthy and enriching options for teenagers is important for their growth, and green spaces may be an ideal safe environment where teens can "develop their identity, individuality, and even promulgate acts of rebellion without real danger" (Matthews et al., 2000, p. 292). Teens may need to be incentivised by the promotion of interesting activities and programmes, as well as the provision of safe, low-cost, and well-maintained green spaces. As stated earlier, teens may also face barriers to green space due to limited mobility, through factors associated with access to public transport or living in safe walkable neighbourhoods. By improving green space facilities,

increasing the number of age appropriate park programmes, and creating a safer community environment, these nature reserves and conservation areas can improve access, boost visitor numbers, and increase awareness of the environment.

Poorly maintained facilities and green spaces can also serve as a barrier to use. People often seek outdoor spaces for aesthetic reasons, and a failure to meet these expectations, such as from insufficient maintenance and neglect, may prevent users from accessing such spaces. Green space users are not interested in visiting spaces which are visually unappealing and feel neglected. Without proper maintenance and facilities, green spaces do not invite creative play and social settings that might act as gathering places for friends or family (Gobster, 2002; Rishbeth, 2001). Park maintenance is important to consider when drawing users into green space. When asked what improvements could be made to the green space, a number of users stated maintenance, through improved facilities or rubbish pick-up, was an important way to enhance users' experience of the place. Aesthetic considerations are clearly important to green space usage, given the number of users who visited green spaces because they were 'beautiful locations.' Neglect of existing green spaces is an environmental injustice that can result from procedural or bureaucratic inequities and can make these spaces feel dangerous, unpleasant and unwelcoming, to such a degree that the green spaces become rarely used (Boone et al., 2009). A poorly maintained green space may add to a residents' sense of disorder or fear (Brownlow, 2006). In this study, the limited use of Edith Stephens and Zandvlei Nature Reserve (main office area), despite being close in proximity to residential areas, suggests that barriers to access exist, such as poorly maintained or inappropriate facilities that do not address the needs of the local community. In order to encourage green space usage and improve access within Cape Town, efforts must be made to ensure proper clean-up of public green spaces, as well as maintenance of facilities and the introduction of appropriate programmes and activities.

7.6 Information Barriers

Previous studies have documented that the lack of awareness of park programmes is an important barrier to green space use (Scott & Jackson, 1996). Data collected in this study supports this view, where a number of the public surveyed were unaware of the respective green space or were unaware of what the green space had to offer. The majority of the public surveyed resided in suburbs around or near the green space, and yet had no idea where the green space was or what the reasons were for visiting. At Edith Stephens, where the number of green space visitors was extremely low, a majority of the public surveyed lacked information about the place and its programmes. Many had no idea that Edith Stephens was a park, despite passing by the entrance daily when travelling to work. Studies conducted in Alberta, Canada (Alberta Community Development, 2000), Arizona (Virden & Yoshioka, 1992), and Texas (Scott & Kim, 1998), all reported that lack of information was a strong constraint on greater use of green spaces. According to the nationwide sample conducted by Godbey et

al. (1992), one-third of Americans said lack of information was why they did not participate in local recreation programmes. In this study, challenges of knowledge dissemination were issues for certain green spaces. According to a reserve employee at Zandvlei, advertising programmes at the nature reserve are difficult due to bureaucratic protocols, therefore they rely on their Friends group to publicise events to the community (personal communication, 14 Feb 2013). Knowledge awareness campaigns for the green spaces in the City must become more streamlined. Developing programmes and activities that will draw adults and entire families is necessary, as green spaces currently serve a fraction of the local population (Cohen et al., 2010). More services must be provided and communicated. Investments in park programming and unique green space features appear to be associated with higher use (Cohen et al., 2010), and evidence from this study reveals that this may be true for Cape Town, where a number of the public did not visit the green space because it did not suit their interests. Many users suggested media campaigns and improved signage to increase awareness and attract more visitors to the green spaces. A recent advert in the local newspaper about the newly opened tea room in Rondevlei attracted a number of visitors who were simply curious to investigate the new attraction. Efforts such as these may prove successful at other green spaces in Cape Town so the associated benefits of access to green open space can be enjoyed by a greater proportion of the population.

7.7 Towards Improved Green Space Access and Use in the City of Cape Town

Global studies confirm the importance of green open space to the health and well-being of urban dwellers, and access to green spaces is crucial to procuring these benefits. This study explores what, if any, barriers exist in accessing public green spaces in Cape Town. Data suggests that proximity, public transport, safety and security, the City's spatial development, park interest, and information barriers all play a role in preventing access to green spaces within Cape Town. Park management and the City Council have challenges to overcome to address these issues. Securing funding is a continual struggle among the nature reserves and conservation areas, severely limiting their ability to address the varied green space interests within the community, as well as create and promote awareness campaigns to advertise the space. The City itself must target issues such as safety and security, improvements in the public transport system, and addressing historical development inequities. It is crucial for urban planners to understand the community they are developing in order to tackle any disparities or environmental injustices; planning officials may not have the same perspectives on the desired amount, distribution, and quality of public green spaces as do the residents of the urban area for which they are planning (Broussard et al., 2008). Open green spaces have a particular role to play in the sustainability and liveability of towns and cities, and the provision of which requires appropriate planning approaches, implementation strategies, and financial resources (ibid.). The future of Cape Town's green spaces, and its richness in biodiversity, is reliant on well-informed urban planning and development to provide denser urban centres, improved public transport, and the creation and preservation of urban green spaces.

8 Conclusion

As cities become increasingly urbanised around the globe, allocation of land for green spaces and conservation areas is threatened by growing demands for development of homes and commercial spaces. In Cape Town, both a city distinctly shaped by its post-apartheid spatial development and characterised by its unique and irreplaceable biodiversity, land conservation and access to these urban green spaces is particularly pertinent. This study focuses on eight nature reserves and conservation spaces located in areas of varying economic and social equity, in the southern and eastern suburbs of Cape Town. It aims to discover who is using these urban green spaces, how they are accessing the sites, and why. The study seeks to find out if barriers to green space access exist, and if they do, whether they are physical, economic, or socially driven barriers. Results revealed that barriers to access green space do exist and include, but are not limited to, proximity, public transport, safety and security, the spatial development of the City, varied green space interests, and information barriers regarding green spaces. Therefore, the barriers to access are physical (proximity, spatial development of the City), economic (public transport), and socially driven (safety and security, varied green space interests, and information barriers).

The study was conducted using a case study method approach, and through key informant interviews, park user surveys, and public surveys, data was gathered from almost 1,000 individuals on access of green space in Cape Town. Key informant interviews were conducted with reserve managers, and representatives from the Friends of groups (n=6), as well as qualitative and quantitative surveys of park users and public. Park users (n=672) were surveyed on site, at one of the eight green spaces, over a period of five 3-hour visits. The public (n=317) were surveyed at the nearest commercial shopping area adjacent to the green space. The aims of the surveys were to determine who is and who is not accessing green space in Cape Town, as well as how and why they are accessing the specific green space. This was achieved in the park user surveys through various outcome measures, which included demographic information, suburb of resident, mode of transport, reasons for choosing mode of transport, frequency of green space visits, and reasons for visiting. In addition, maps were created through GIS to illustrate transport routes as well as suburb maps which demonstrated where users resided in relation to the respective green space. Public surveys were similar in that they collected demographic information and suburb of residence, in addition to whether they visit the green space and the reason for visiting or not visiting. The data allowed for a further analysis of why or why not individuals are using these eight green spaces in Cape Town.

While many factors may influence access to green spaces, six main themes emerged from the data collected in the study: proximity, public transport, safety and security, spatial development of Cape Town, park interests, and information barriers. According to Coles and Bussey (2010), the distance to a green space is the most important factor in determining access. In this study, the majority of users live within a 2 kilometre radius of the green space they visited. In green spaces where exercise and dog walking were the most common reasons for visiting, the majority of users lived within a 1 kilometre radius of the green space, visited daily or weekly, and had higher percentages of users walking to the green space. For those users who don't live close, public transport is an alternative. However, traveling on public transport in Cape Town is limiting and transport routes are often delivered retrospectively, after development has taken place (Mammon et al., 2008), which may act as a deterrent to green space users. Results from the study show that only 3 individuals travelled by public transport, out of a total of 672 surveyed, to use green space while the vast majority used a private car (owned or shared). Users often sighted safety as a reason for taking a car, rather than using public transport as a means of accessing the green space. Safety and security concerns were voiced among both park users and the public, which can lead to individuals avoiding green spaces due to fear (Weiss et al., 2010). Certain underutilized green spaces are also located in neighbourhoods where crime and safety were particularly noted by the public as reasons for not visiting the green space, particularly in the Metro South-East, where the majority of households living in absolute poverty are located (Ewing & Mammon, 2008). The effects of spatial development within Cape Town impact how neighbourhoods are divided in the City, resulting in patterns of social segregation and physical fragmentation (Turok, 2001). The results of this study show how the ethnic breakdown of green space users may not reflect the overall ethnic breakdown of Cape Town's population. According to the 2011 Census, 39% of the population is black African, while 7% of green space users in this study are black African, which may be a reflection of where the green spaces were located and the ethnic breakdown of the adjacent neighbourhoods, or may be due to individual park interests not being met by the eight green spaces in the study. Green space users are particular in their specific interests which determine what type of green space they seek out. Of note is the number of the public who did not visit the green space near them due to lack of interest, or expressed interest in visiting other parks or beaches which better suit their needs. In addition, the public also did not visit the green space because of an unawareness, or lack of knowledge, about the green space. Over one quarter of users were either not aware of the respective green space, or lacked knowledge on what the green space had to offer. These main themes of proximity, public transport, safety and security, spatial development of Cape Town, park interests, and information barriers may act as obstacles to how people access urban green spaces in Cape Town.

The study is not without its limitations. The case study approach often involves large volumes of data, and, due to time constraints, an in-depth analysis may be more limited than desired (Crowe et al., 2001). The descriptive

method of analysing data was useful, but it leaves work open in the future to fully understanding more ethnographically-derived perceptions and views around why people use or don't use parks. A more in-depth analysis of individuals in one or two parks may reveal another story in urban green space access. Respondent bias may also be a concern in this research approach, as individuals may veer towards social desirability, which is the inclination of an individual to deny socially undesirable behaviours and to admit to socially desirable ones (Randall & Fernandes, 1991).

The results of this study may lead to further research in access of urban green spaces through cross city comparisons in South Africa and across the world. For more specific observations, research could be conducted at one or two specific parks, over longer periods of time, with more detail on the history of the green space and its development, and the neighbourhood characteristics around the green space. The glaring observation that black Africans make up a very small proportion of those surveyed could lead to further investigations in urban green spaces located in neighbourhoods with predominantly black African populations. It would be interesting to analyse the quality of the green spaces within those neighbourhoods as well.

Current studies recognise the importance that urban green space has for its users, through a multitude of benefits which include mental, physical, emotional, and social health. The 2012 Spatial Development Framework for Cape Town calls for "the availability and accessibility of basic services, social facilities and public opens spaces to everyone" (CoCT, 2012b, p. 26). Unfortunately, challenges remain and for many residents of poor suburbs, public green space is inaccessible due to distance, and cost of transport and admission (CoCT, 2013). The results of this study revealed the majority of green space users visited green spaces within two kilometres distance of their residence, and travelled by personal vehicle. Safety and security affected both green space users and the public accessing particular green spaces in certain areas, where crime and theft was noted as an issue. The racial breakdown of users contrasted with that of the 2011 Census, indicating that substantially more white Capetonians access green space than other ethnicities, which may be a reflection of the City's post-apartheid spatial development. Park interests and lack of awareness also influence how users access a particular green space. This study highlights some of the barriers that exist to green space users in Cape Town such as proximity, transport, safety and security, spatial development of Cape Town (location of green space), specific park interests, and gaps in knowledge.

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9 Appendix

The Appendix is comprised of two sections, which include public suburb maps (9.1), and survey forms (9.2).

9.1 Public Suburb Maps

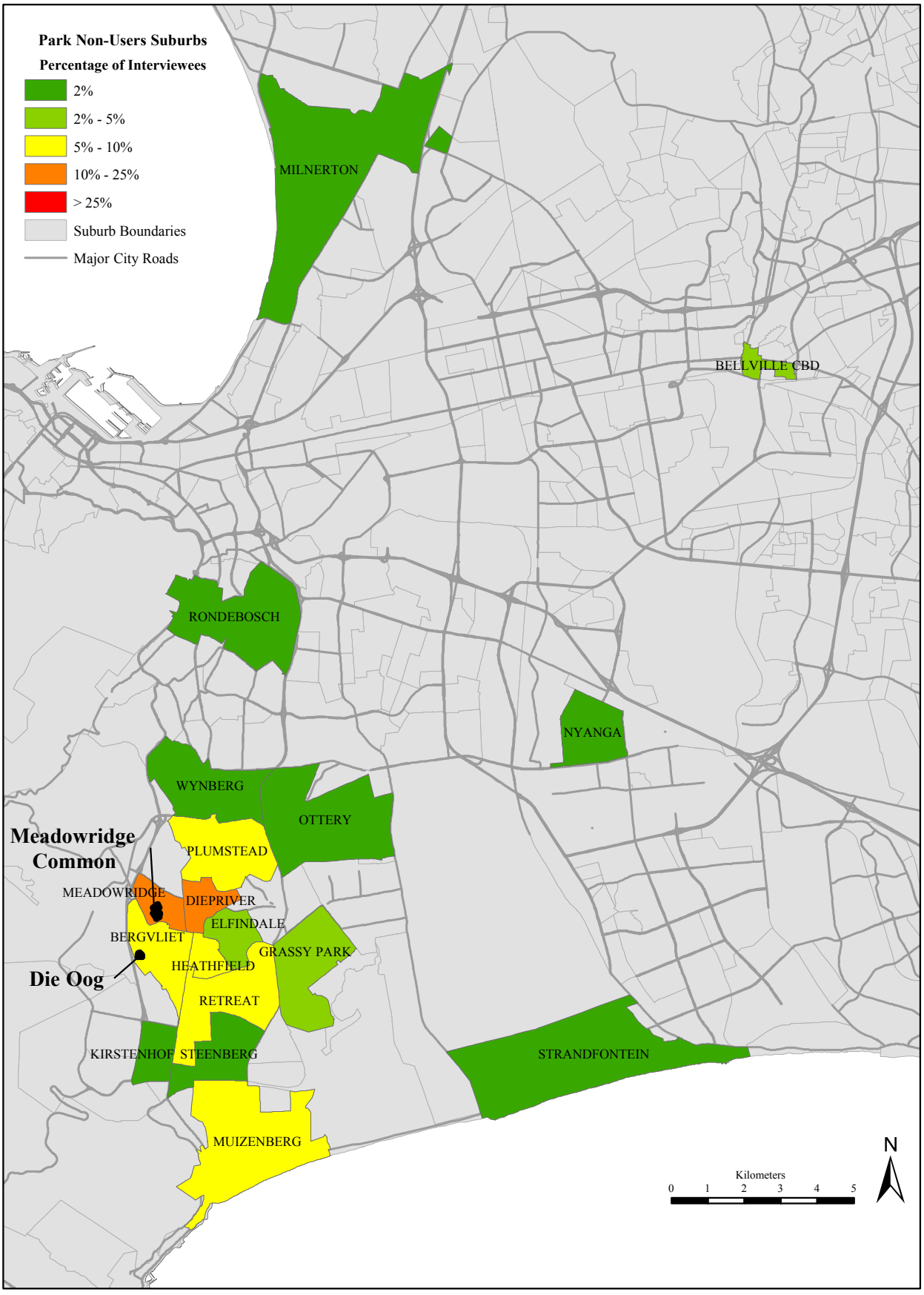

FIGURE 25: Die Oog Conservation Area and Meadowridge Common Non-User Suburb Map (n= 64)

Source: City o f Cape Town Maps Department, March 2011

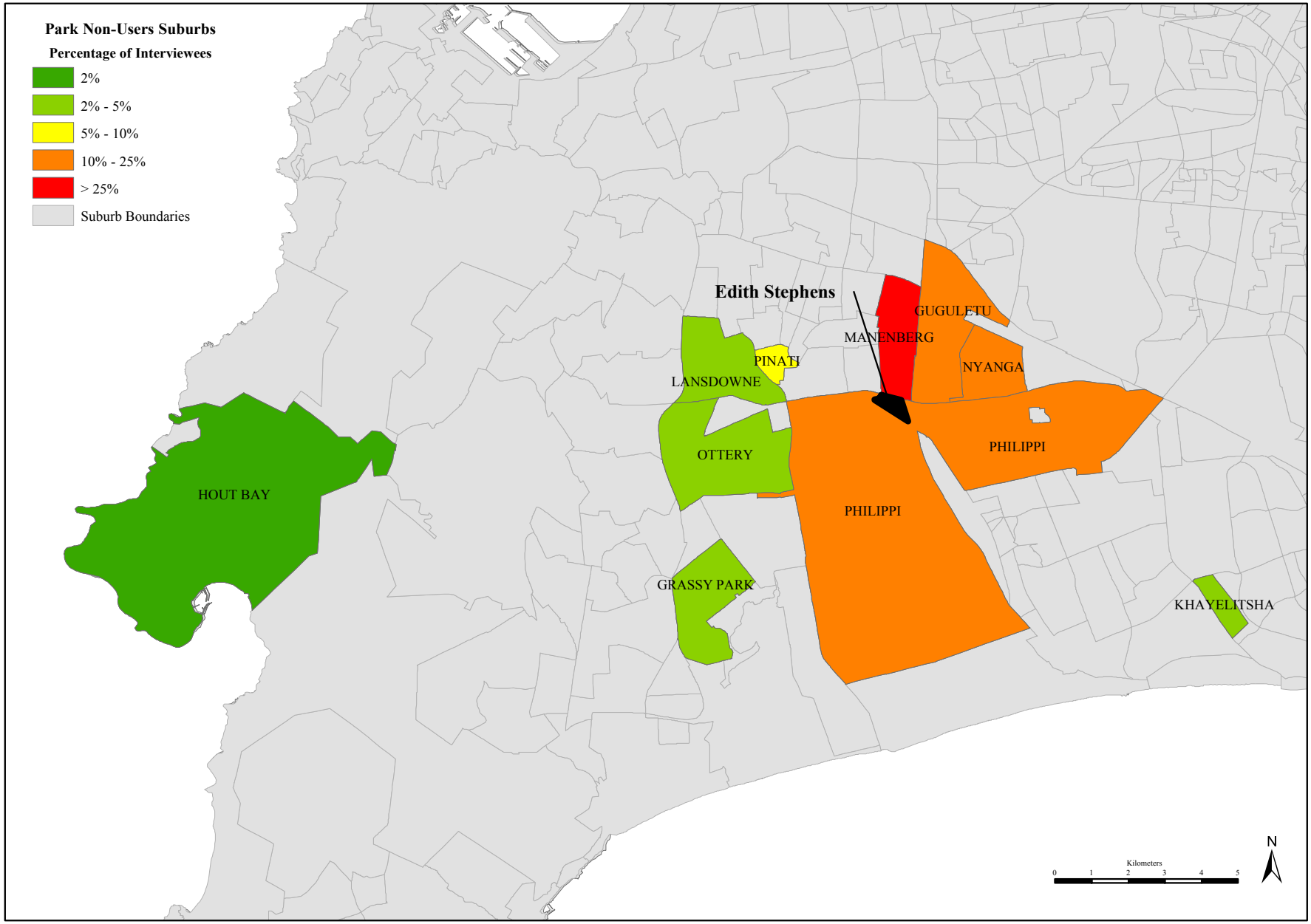

FIGURE 26: Edith Stephens Wetland Park Non-User Suburb Map (n=62)
Source: City o f Cape Town Maps Department, March 2011

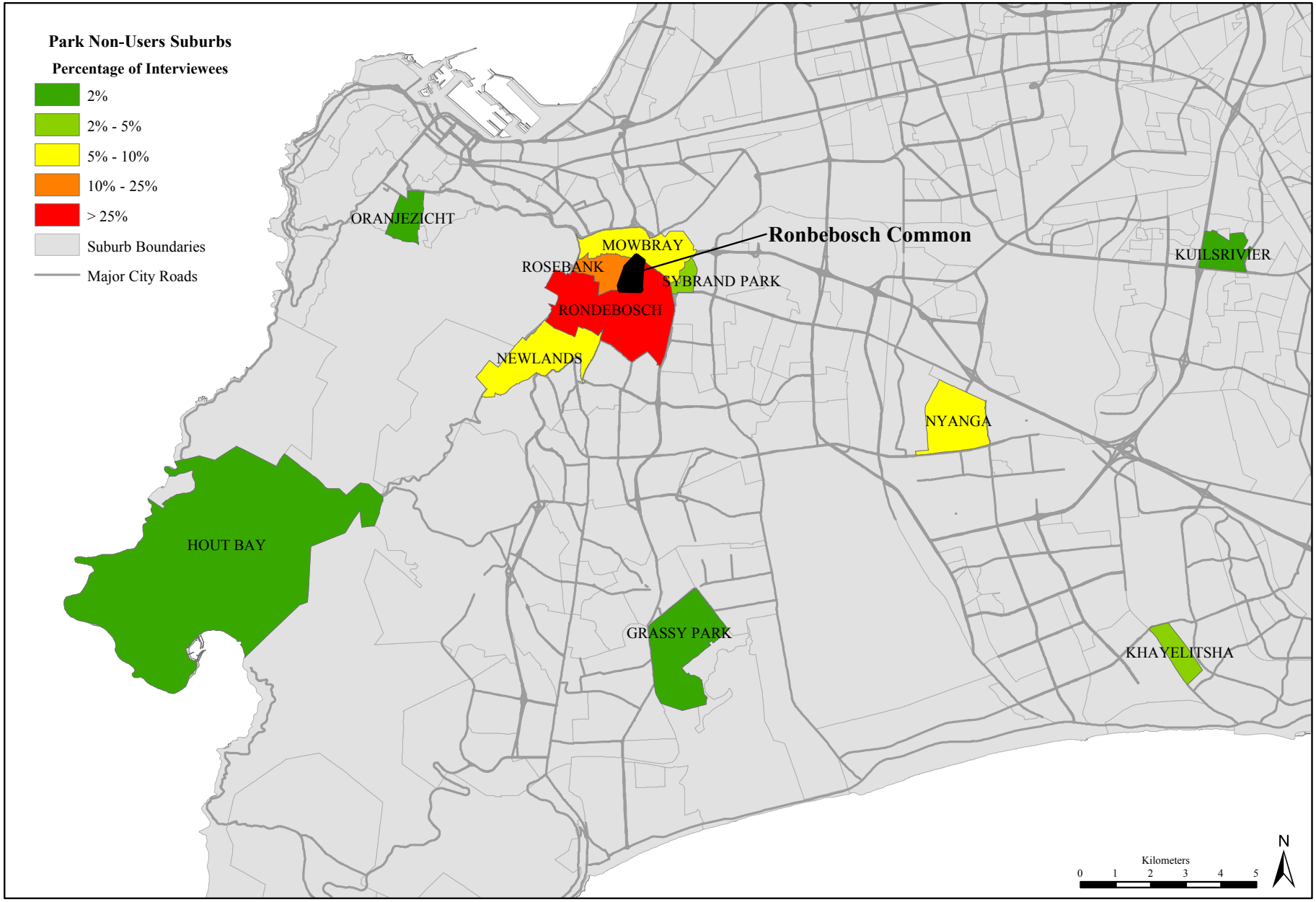

FIGURE 27: Rondebosch Common Non-User Suburb Map (n= 60)

Source: City o f Cape Town Maps Department, March 2011

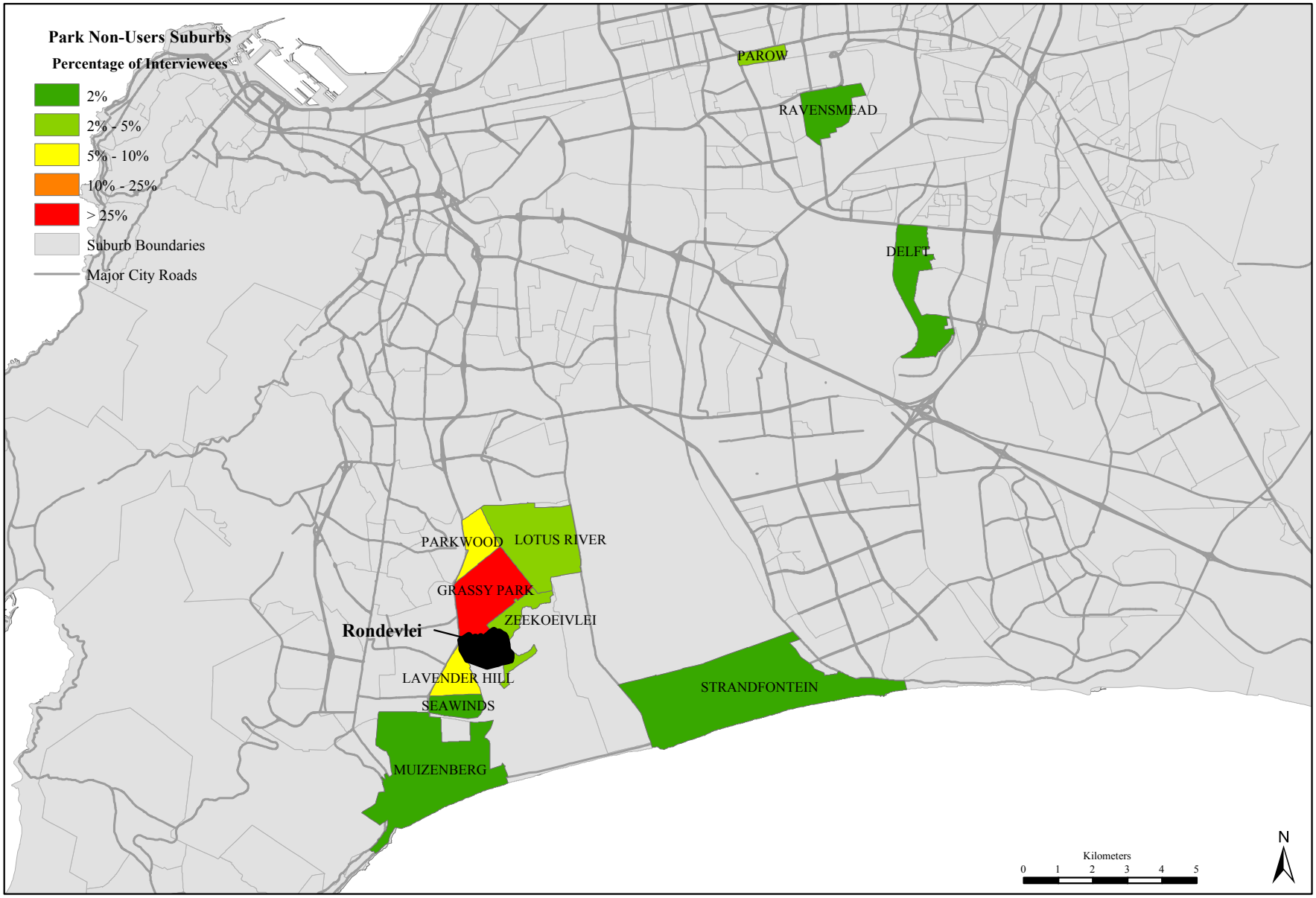

FIGURE 28: Rondevlei Nature Reserve Non-User Suburb Map (n= 73)
Source: City o f Cape Town Maps Department, March 2011

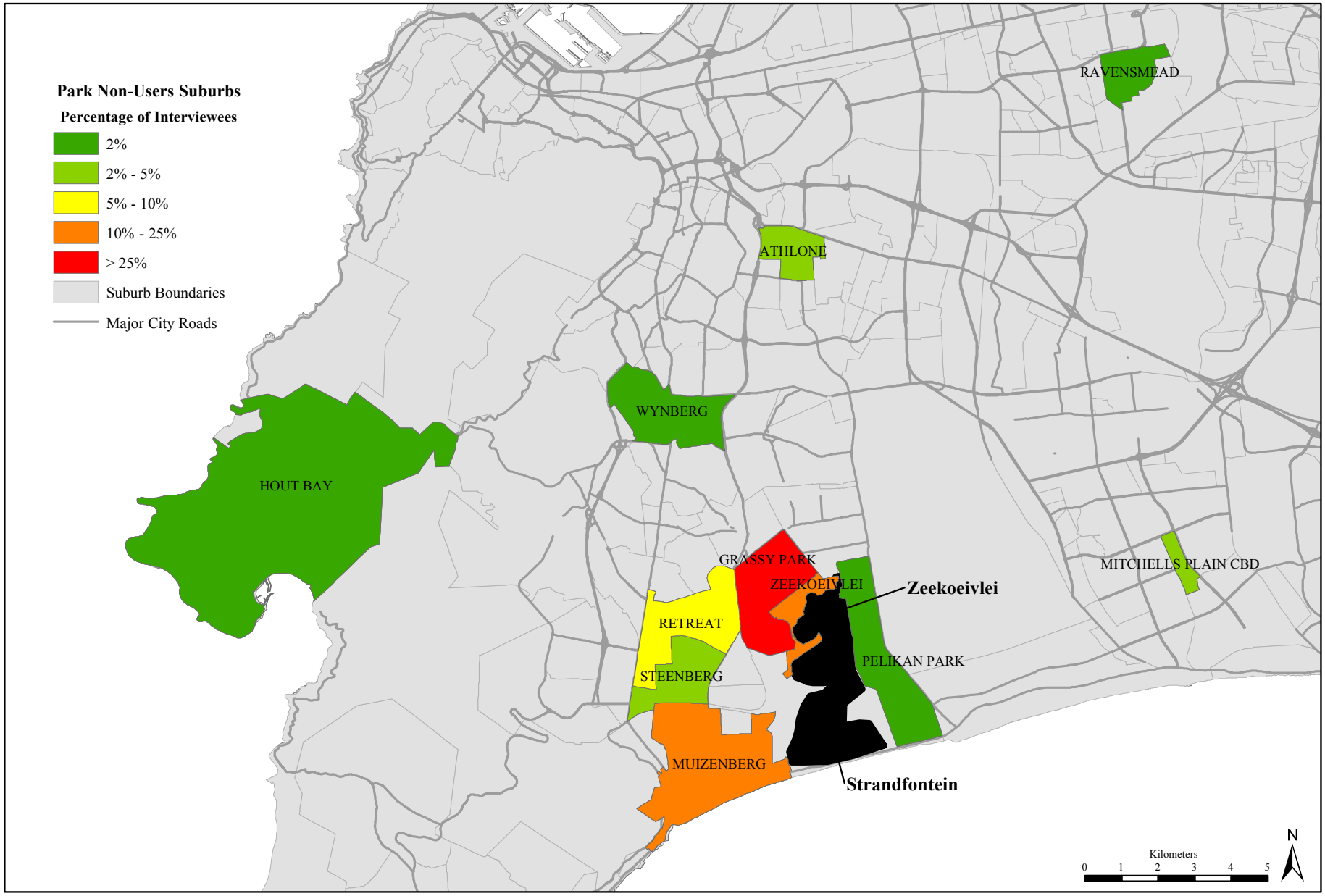

FIGURE 29: Strandfontein Birding Area and Zeekoeivlei Nature Reserve Non-User Suburb Map (n= 65)
Source: City o f Cape Town Maps Department, March 2011

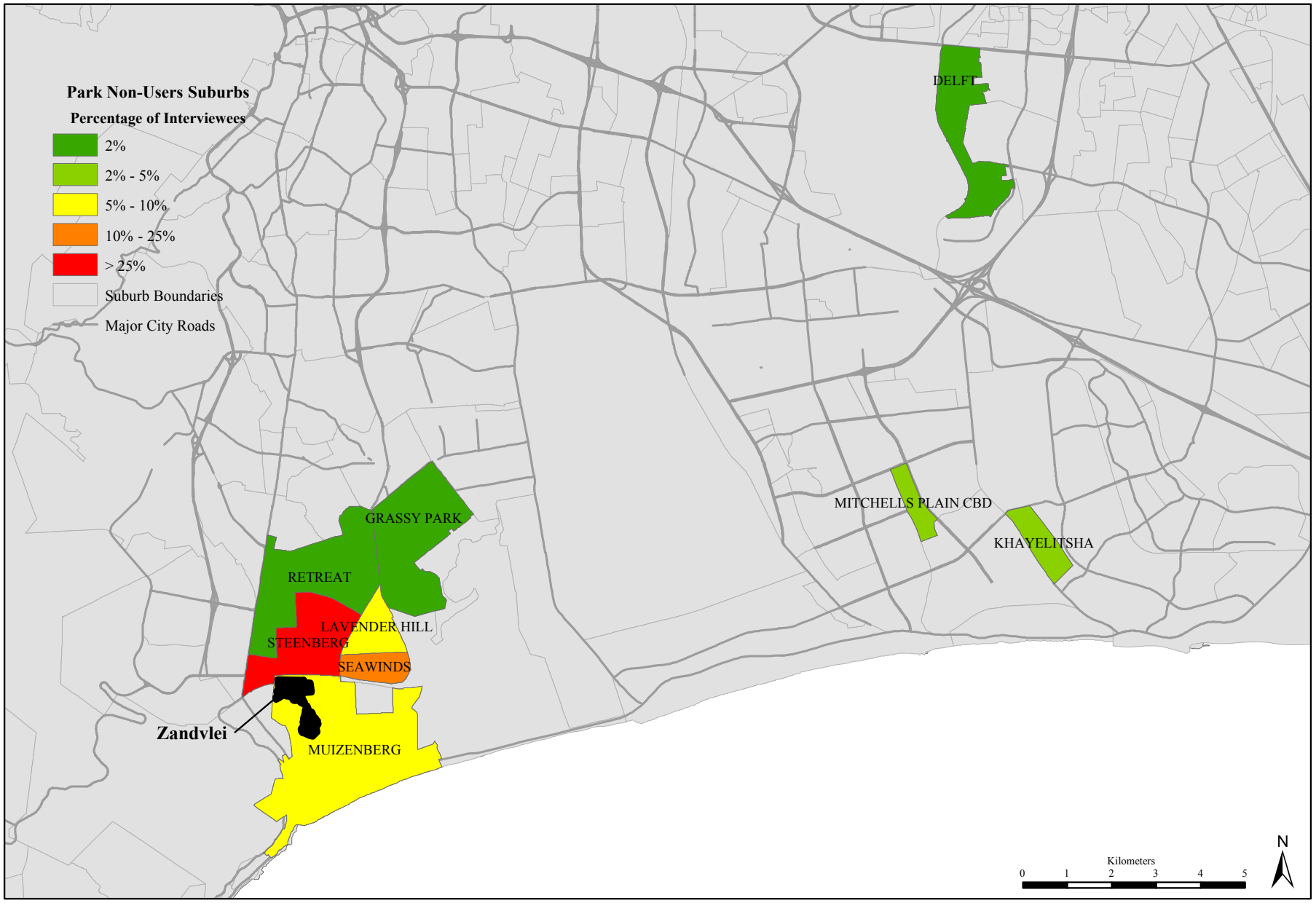

FIGURE 30: Zandvlei Nature Reserve Non-User Suburb Map (n=66)

Source: City o f Cape Town Maps Department, March 2011

9.2 Survey Forms

Key Informant Survey

Reserve/Park: _____ Date: _____

Name: _____

Title: _____

How large is the park?

_____

What is the average number of monthly visitors at the park? Annual?

_____

What types of facilities are in the park (Information center, hiking trails, playground, etc.)?

_____
_____
_____

What types of programs are run by the park?

_____
_____
_____

Is there local community involvement in the park? In what way?

_____
_____
_____

Why do visitors come to the park (list possible reasons)?

_____
_____
_____

What are the public transportation routes around the park?

_____
_____

How do most people access the park (most common form of transport)?

_____
_____

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Accessing Green Spaces in Cape Town:

A study of public perception of green space and barriers of access in seven nature reserves and conservation areas within Cape Town

Research Question:

The study focuses on seven nature reserves and conservation spaces located in areas of varying economic and social equity, in the southern and eastern suburbs of Cape Town. The goals of this research are to discover who is using these urban green spaces, how they are accessing the sites, and why. This project seeks to answer the following questions:

How accessible are Cape Town's urban green spaces? Do barriers exist, and if so, are they physical, economic, or socially driven?

Aims and Objectives:

- Identify who accesses urban green spaces in the City of Cape Town by establishing a demographic profile
- Evaluate who is and who is NOT using green space and conduct an investigation as to why.
- Determine how these users are accessing the selected urban green spaces
- Establish transportation routes in relation to the specific green spaces in study
- Establish why users are visiting green spaces and evaluate people's reasons and rationale for visiting green space

Confidentiality

I understand the purpose of the study and that all information given will remain confidential and anonymous.

_____ _____

Initial Date

MASTERS DISSERTATION SURVEY

A. Age Group

< 15	16 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	Older

B. Gender

Male	Female

C. Ethnicity

White (SA)	Black (SA)	Coloured (SA)	Asian (SA)	Other

D. Residential suburb

E. Occupation

List Occupation Below:

Management		Business/Finance Operations		Computer/ Mathematical		Architecture/ Engineering		Life/Physical/ Social Sciences	
Community/ Social Services		Legal		Education/ Training/ Library		Arts/Design/ Entertainment/ Sports/Media		Healthcare Practitioners	
Healthcare Support		Protective Services		Food Prep/Serving Related				Bldg & Grounds, Maintenance	
Personal Care/ Services		Sales and Related		Office and Admin Support		Farming/Fishing/ Forestry		Construction/ Extraction	
Installation/ Maint/Repair		Production		Transport/ Material Moving		Military		Other	

F. Why are you visiting this location?

G. How did you get here?

Car own	Car shared	Car taxi	Motorbike	Bicycle	Bus	Minibus taxi	Train	Walk	Other

H. Why did you choose this mode of transport?

I. How often do you come here?

Weekly

1	2	3	more than 3	Daily

Monthly

1	2	3	4	5 or more

Annually

1st time	1-5	6 - 10	10 - 20	more than 20

J. Do you have any suggestions on improvements made to the park? In particular, how to increase visitorship?

MASTERS DISSERTATION SURVEY- NON PARK USERS

Location

Nearest Park Location

A. Age Group

< 15	16 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	Older

B. Gender

Male	Female

C. Ethnicity

White (SA)	Black (SA)	Coloured (SA)	Asian (SA)	Other

D. Residential suburb

E. Occupation

List Occupation Below:

Management		Business/Finance Operations		Computer/ Mathematical		Architecture/ Engineering		Life/Physical/ Social Sciences	
Community/ Social Services		Legal		Education/ Training/ Library		Arts/Design/ Entertainment/ Sports/Media		Healthcare Practitioners	
Healthcare Support		Protective Services		Food Prep/Serving Related				Bldg & Grounds, Maintenance	
Personal Care/ Services		Sales and Related		Office and Admin Support		Farming/Fishing/ Forestry		Construction/ Extraction	
Installation/ Maint/Repair		Production		Transport/ Material Moving		Military		Other	

F. Do you visit park or reserve? Why or why not? If yes, how often do you visit?